TECHNOLOGY DEPT.

Gas Journal

VOL. 275. 105TH YEAR. LONDON, SEPTEMBER 2, 1953. NO. 4709. PRICE 1/3

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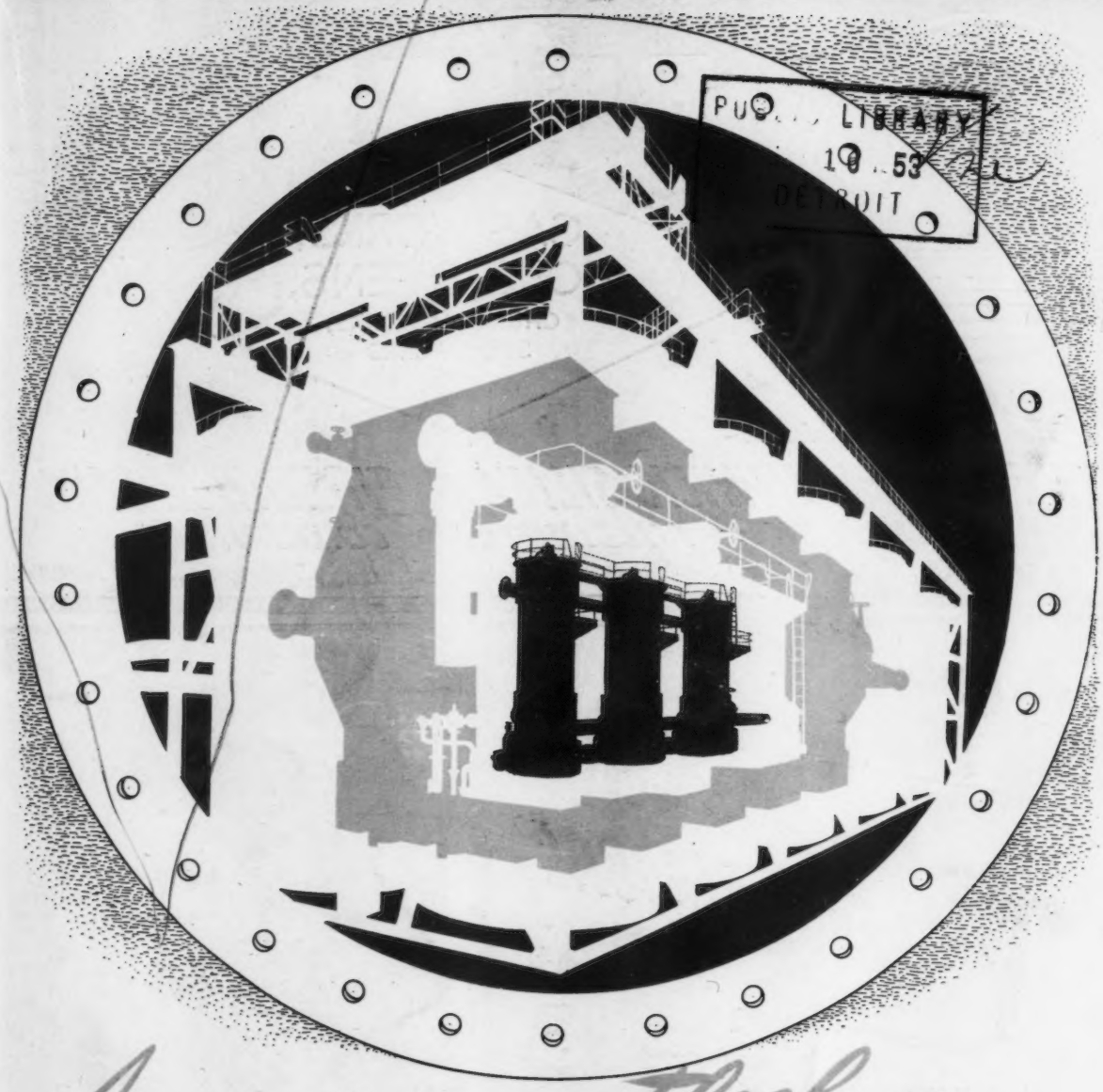

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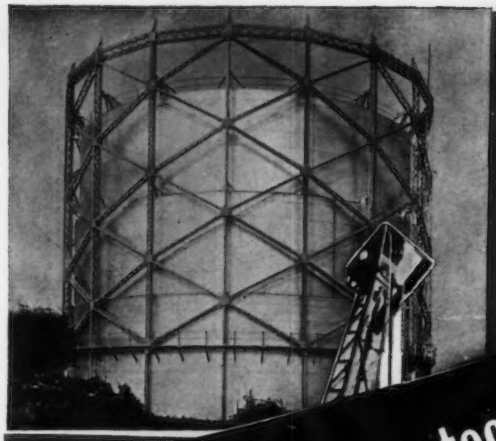

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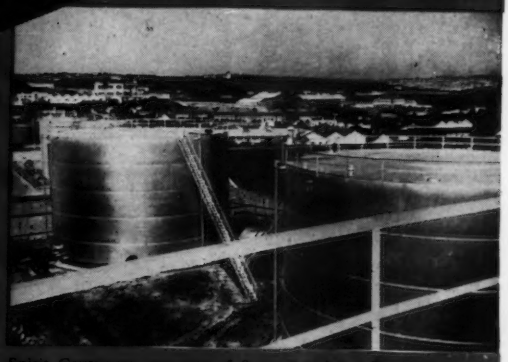

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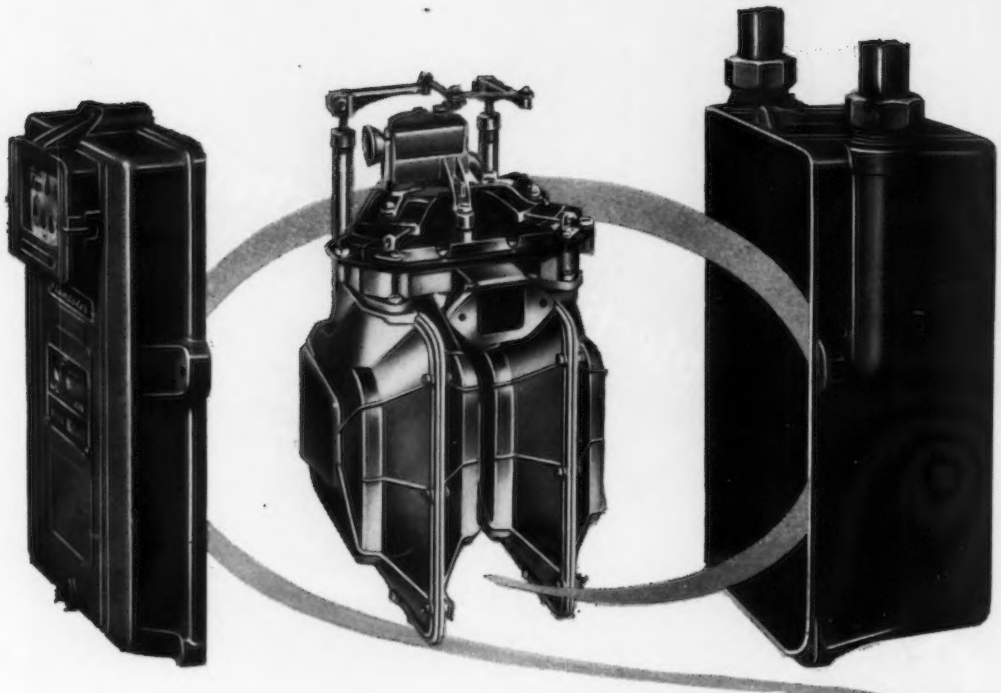

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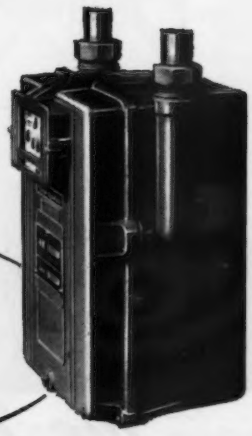

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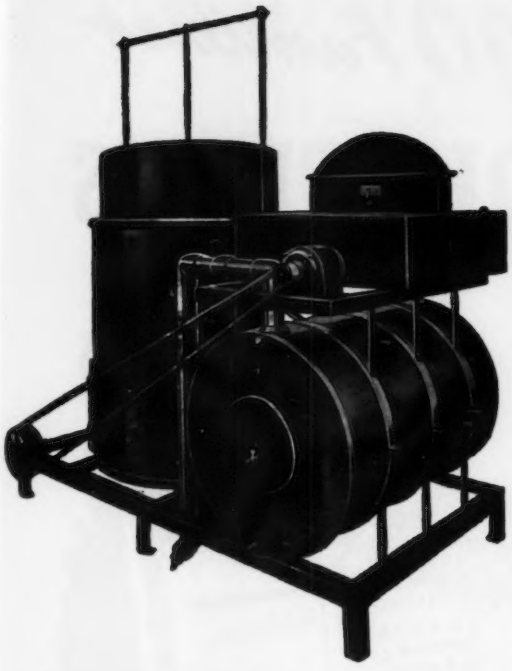

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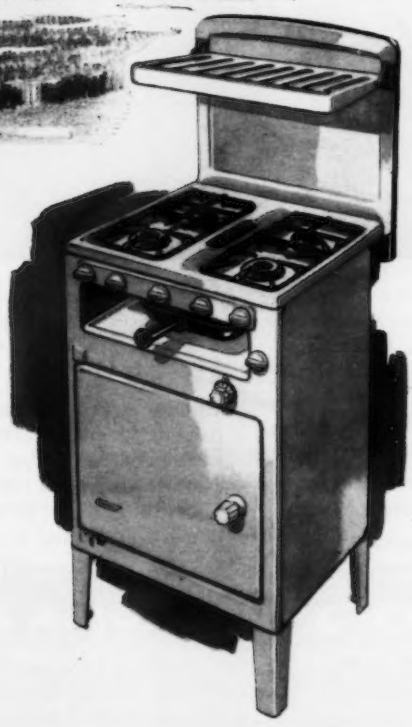

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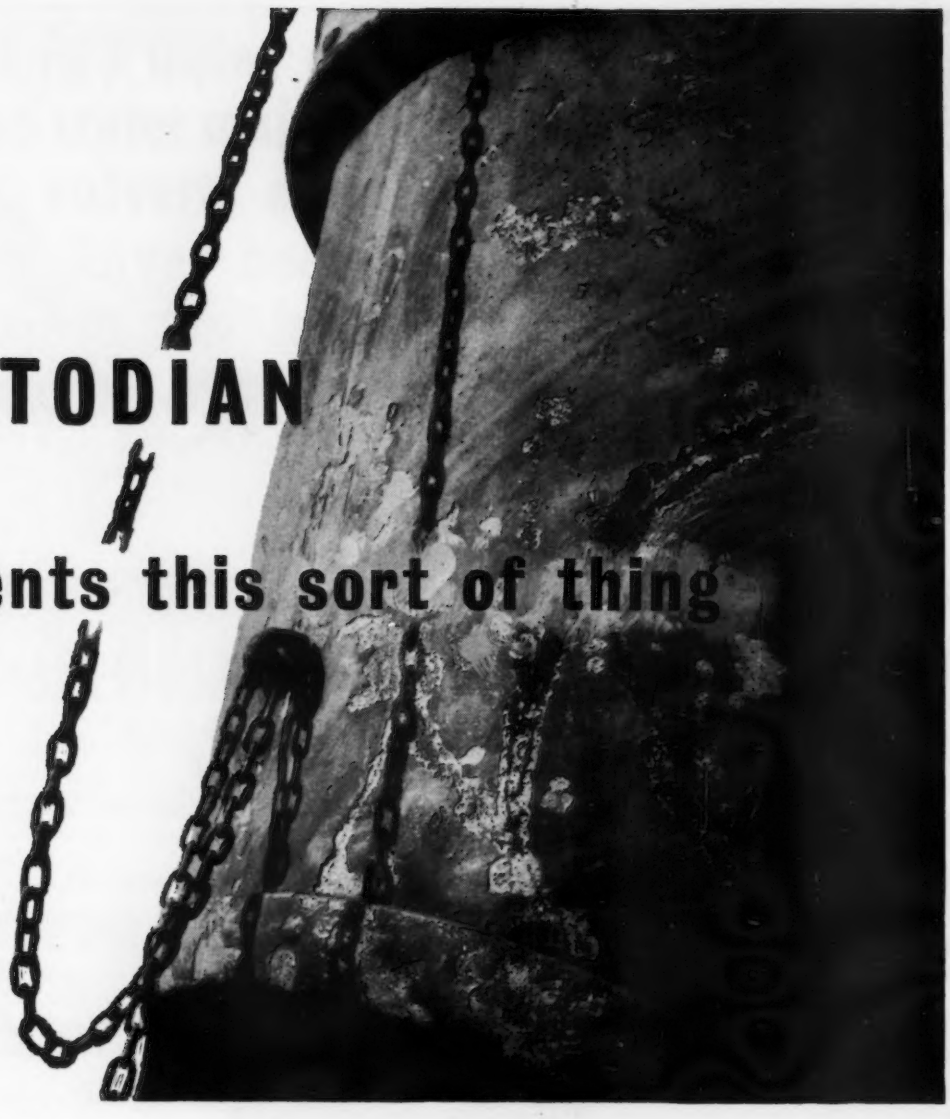

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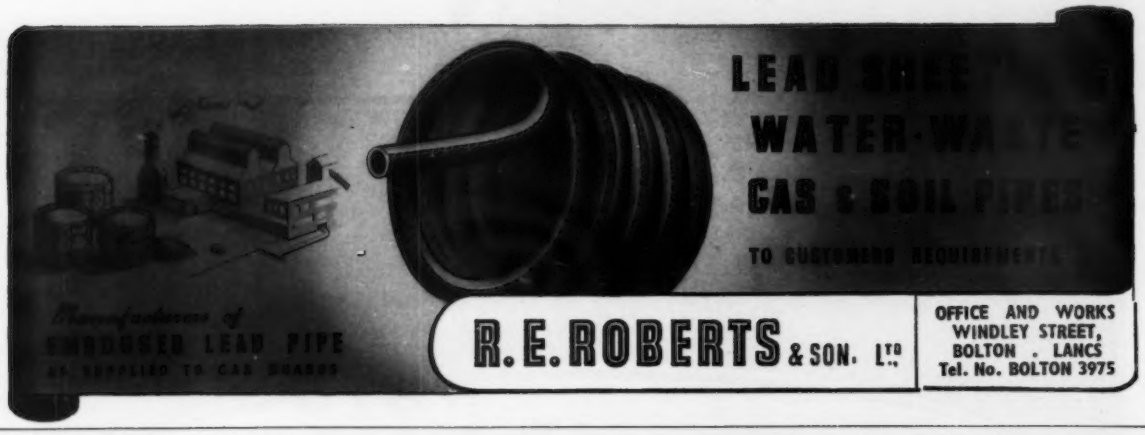

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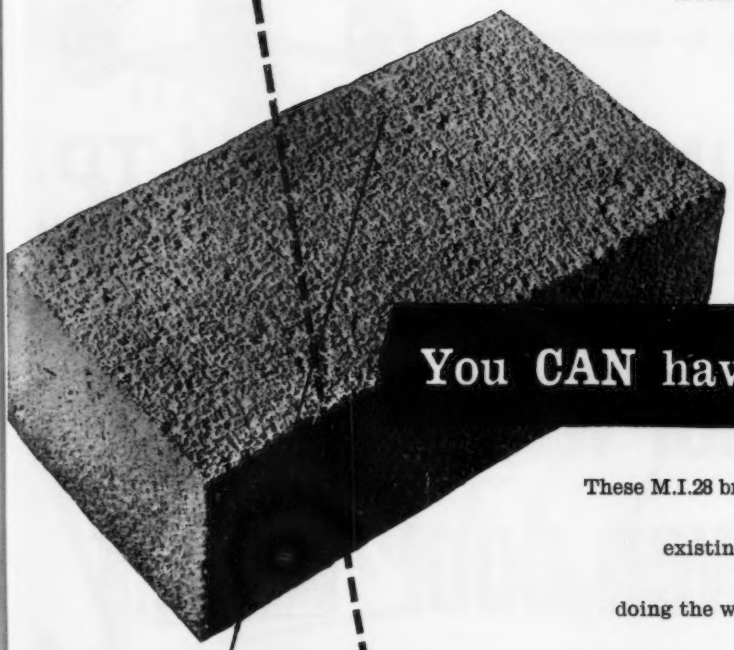

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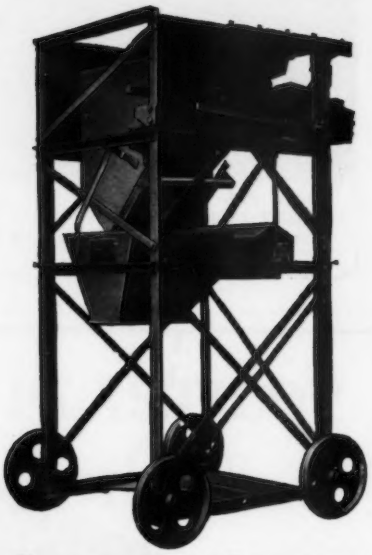

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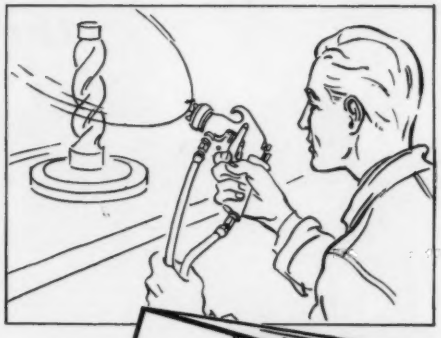

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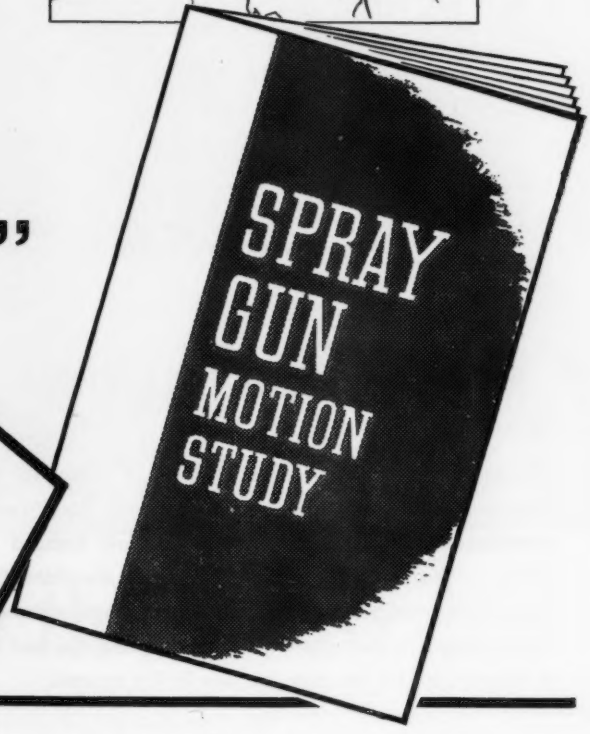

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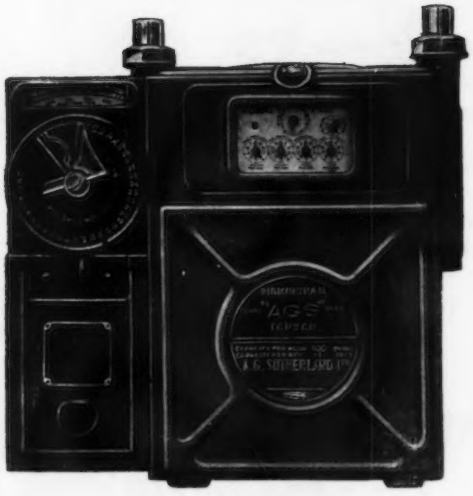

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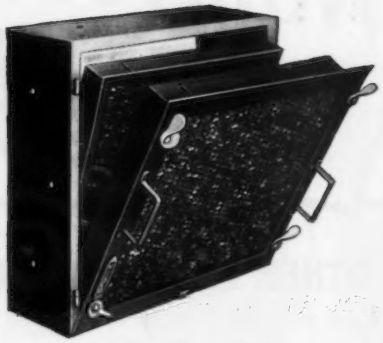

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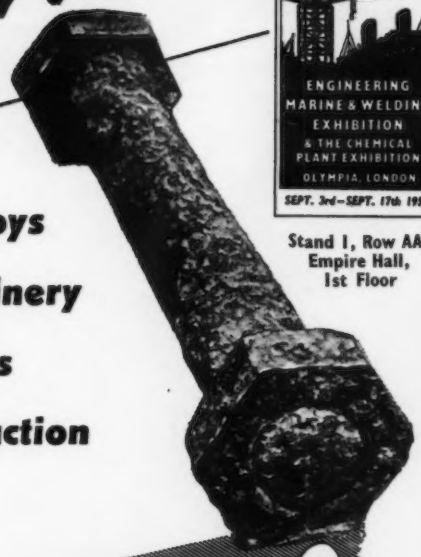

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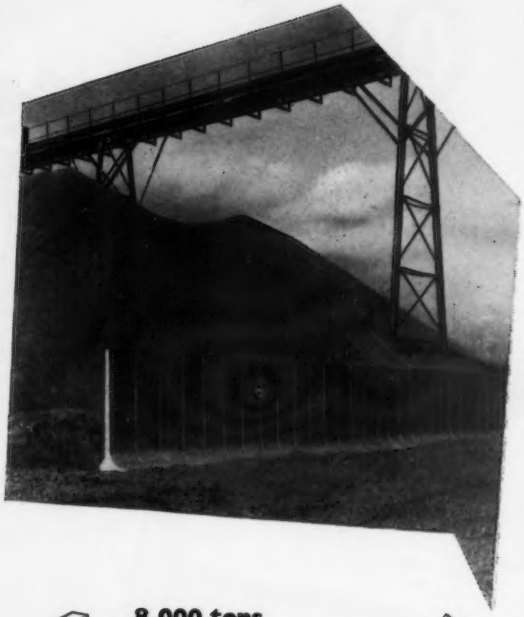

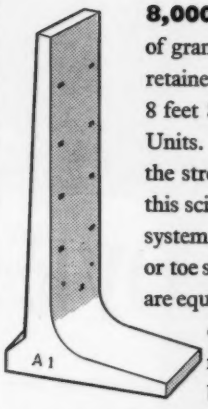

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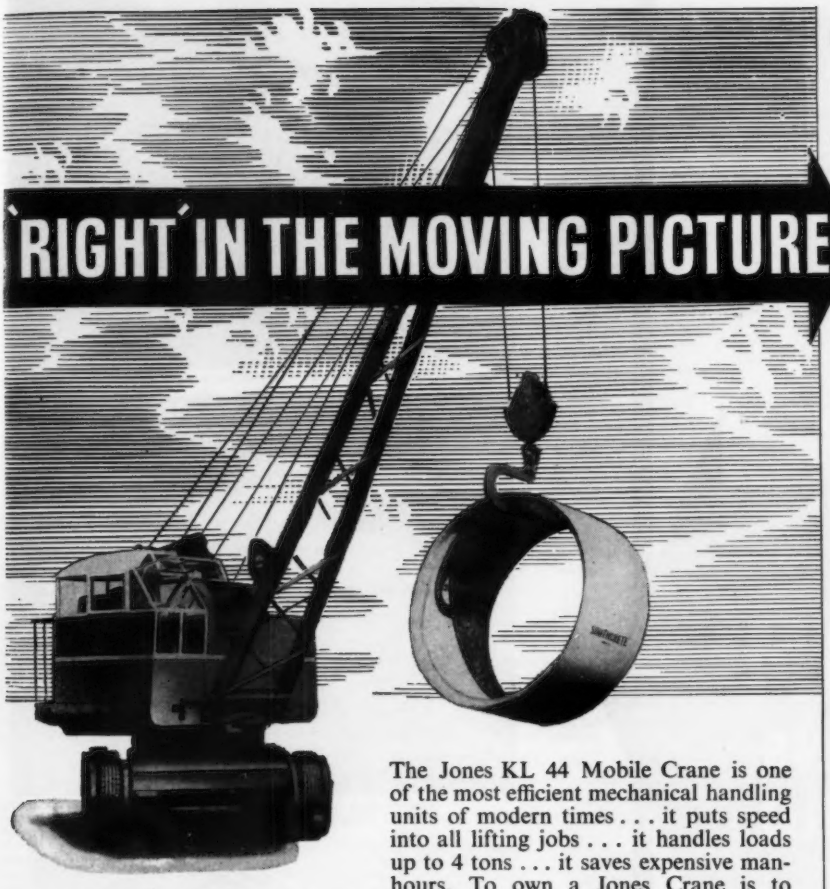

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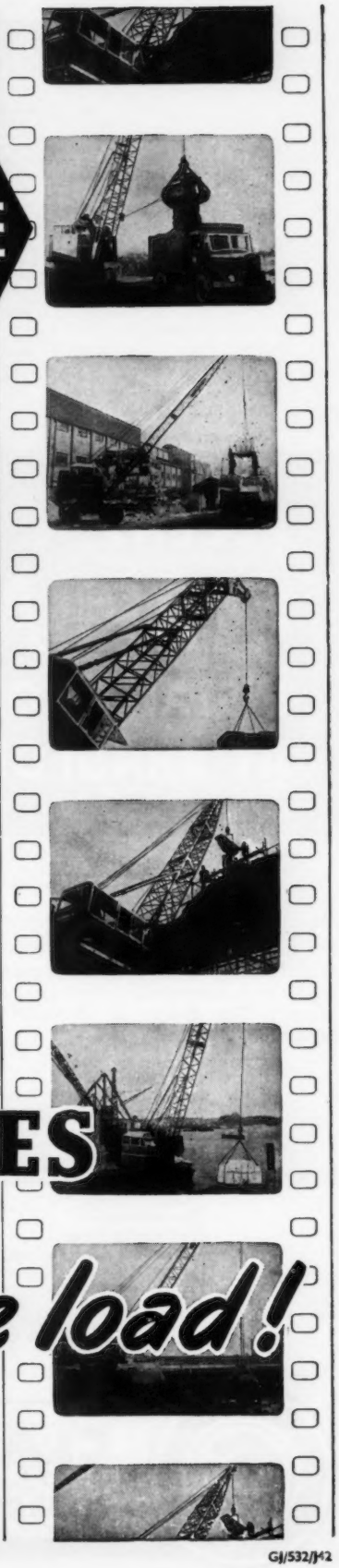

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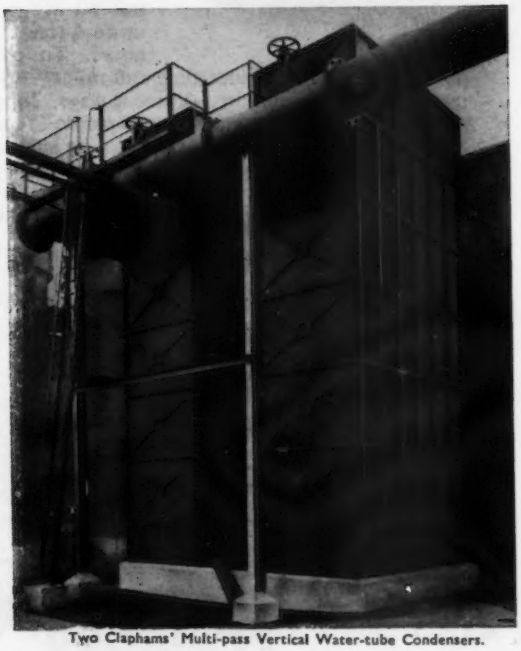

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INDEX TO 'JOURNAL' ADVERTISERS

A — PAGE

A.C.E. Machinery, Ltd. ... ...
Abbott, Birks & Co., Ltd. ... ...
Accurate Recording Instrument Co. ... ...
Acme Wringers, Ltd. ... ...
Aerogen Co., Ltd. 559
Aerograph Co., Ltd. 569
Alder & Mackay, Ltd. ... ...
Allan Taylor (Engineers) Ltd., ...
Ascot Gas Water Heaters, Ltd. ... ... Cover IV
Ascot Gas Water Heaters, Ltd. (F.A. Neat) ...
Ashmore, Benson, Pease & Co ... Facing p. 585
Ashworth, Thos., & Co., Ltd. ... .
Aspinall's (Paints), Ltd. ... ...
Associated Lead Manufacturers, Ltd. ... ...
Associated Lead Manufacturers, Ltd. (Rustodian) 564
Atlas Preservative Co., Ltd., ... 557
Autocontrol Boilers Ltd. 554
Automatic Telephone & Electric Co., Ltd. ...
Automotive Products, Ltd. ... ...
Averill, C. R. Ltd. ... ...

B

Bale & Church, Ltd. 605
Balfour, Henry, & Co., Ltd. ... ...
Baxwaco Meters, Ltd. 558
Benham & Sons, Ltd. ... ...
Blakeley Firth, Sons & Co., Ltd.,... ... ...
Bolton's Superheater & Pipe Works, Ltd. ...
Booth, John, & Sons (Bolton), Ltd. ... ...
Bratt Colbran, Ltd. ... ...
Bray, George, & Co., Ltd. ... ...
Bray, W. E., & Co., Ltd. ... ...
British Flint & Cerium Manufacturers, Ltd. ... 556
British Gas Purifying Materials Co. ... ...
British Oxygen Co., Ltd. ... ...
British Rototherm Co., Ltd. S5
British Thermostat Co., Ltd. ... ...
British Thomson Houston, Ltd. ... ...
British Tyre and Rubber Co., Ltd. ... ...
British Vacuum Cleaner & Engineering Co., Ltd.
Broadbent, Thomas, & Sons, Ltd. S7
Brockhouse Heater Co., Ltd. ... ...
Broom & Wade, Ltd. ... ...
Brown, J., & Co., Ltd. 602
Bugden, Thos., & Co. ... ...

C

Cambridge Instrument Co., Ltd. ... ...
Cannon (G.A.) Ltd. 560
Cementation Co., Ltd. ... ...
Chamberlain Industries, Ltd. ... ...
Chemical Engineering Wiltons, Ltd. ... ...
Chemical & Insulating Co., Ltd. ... ...
Cinema-Television, Ltd. ... ...
Clapham Bros., Ltd. 576
Clayton, Son & Co., Ltd. 601
Clifford Engineering Co., Ltd. ... ...
Cohen, George, Sons & Co., Ltd. 559, 575
Concentric Manufacturing Co., Ltd., ...
Concrete Proofing Co., Ltd. ... ...
Cort, Robert, & Son, Ltd. 555
Cox & Danks Ltd. ... ...
Crane, Ltd. ... ...
Crone & Taylor, Ltd. ... ...
Crosby & Co., Ltd. ... ...
Crossley Bros. 602
Curtis, A. L., & Co. ... ...
Cutler, Samuel, & Sons, Ltd. ... ...

D

Davenport Engineering Co., Ltd.... ... ...
Davey, Paxman & Co., Ltd. ... ...
Dawe Instruments, Ltd. ... ...
De la Rue, Thomas, & Co., Ltd. (Gas Group) ...
Dempster, R. & J., Ltd. 553
Dempster, Robert, & Sons, Ltd. 588
Derbyshire Silica Firebrick Co., Ltd. ... ...
Diaphragm & General Leather Co., Ltd.... ... 566
Dick, R. & J., Ltd. ... ...
Donkin (The Bryan) Co., Ltd. ... ... Cover II
Douglas, Robert M., (Contractors), Ltd. ...
Douglas, William, & Sons, Ltd. ... ...
Drakes, Ltd. ... ...
Drew, H. B., Ltd. ... ...
Dunlop & Ranken, Ltd. ... ...
Dunlop Rubber Co., Ltd., (Gen. Rubber Goods Div.) 596

E

E.B. Refractory Cement Co., Ltd. ... ...
Easiclene Porcelain-Enamel (1938) Ltd. ... ...
Edgar, William, & Son, Ltd. ... ...
Elcontrol, Ltd. 602
Electroflo Meters Co., Ltd. ... ...
Electrolux Ltd., ...
Elliott Bros. (London), Ltd. ... ...
English Electric Co., Ltd. ... ...
Ether, Ltd. ... ...
Evershed & Vignoles, Ltd. ... ...
Evode, Ltd. ... ...
Ewart Chainbelt Co., Ltd.... 602
Expanded Metal Co. Ltd. ... ...

F

F. C. Construction Ltd., ...
Fibreglass, Ltd. ... ...
Flavel, S., & Co., Ltd. 601

PAGE

Fluxite, Ltd. ... ...
Fowler, John, & Co. (Leeds), Ltd. 562
Franki Compressed Pile Co., Ltd. ... ...
Fraser & Chalmers, Engineering Works ... ...
Fry's Metal Foundries, Ltd. ... ...
Fyffe & Co., Ltd. ... ...

G

Gas Chambers & Coke Ovens, Ltd. ... ...
Gas Purification & Chemical, Ltd. 605
General Descaling Co., Ltd. 562
General Electric Co., Ltd. ... ...
General Gas Appliances, Ltd. 571
Gibbons Bros., Ltd. ... ...
Gibbons (Dudley), Ltd. ... ...
Gibson, John, & Son, Ltd.... ... ...
Glover, George, & Co., Ltd. ... ...
Glover, Thomas, & Co., Ltd. 580
Godfrey, Sir George, & Partners (Industrial), Ltd. S7
Goodall Clayton & Co., Ltd. ... ...
Goodyear Mechanical Goods ... ...
Grant & West, Ltd.... 566
Graphite Products, Ltd. 602
Green & Boulding, Ltd. 605
Gunite Construction Co., Ltd. 604

H

Hamilton, A. H., & Co., Ltd. ... ...
Hardman & Holden, Ltd. ... ...
Harris & Pearson, Ltd. ... ...
Harrisons (London) Ltd., ...
Harvey, G. A., & Co. (London) Ltd. ... ...
Hick Hargreaves & Co., Ltd. 604
Hilmor, Ltd. ... ...
Hills (West Bromwich) Ltd. ... ...
Holmes, W. C., & Co., Ltd. ... .. 607, Cover 1
Honeywell-Brown, Ltd. ... ...
Horseley Bridge & Thomas Piggott, Ltd. ...
Horstmann Gear Co., Ltd. ... ...
Howden, James, & Co., Ltd. ... ...
Humphreys & Glasgow, Ltd. 561

I

Ideal Boilers & Radiators, Ltd. ... ...
I.C.I., Ltd. (Metals Division) ... ...
Inertol Co., Ltd. ... ...
Ingham, John, & Sons, Ltd. ... ...
International Combustion, Ltd. ... ...

J

Jeavons, E. E., & Co., Ltd. ... ...
Jeavons Engineering Co. ... ...
Jenkins, W. J., & Co., Ltd. ... ...
Jobling, James A., & Co., Ltd, ... 565

K

Keay, E. C. & J., Ltd. ... ...
Keith Blackman, Ltd. 608
King, Geo. W., Ltd. ... ...
King, Walter, Ltd. 600, 602, 605, 606, S9
Kings Patent Agency, Ltd. ... ...
Kirk & Co. (Tubes), Ltd. ... ...
Kirkham Hulett & Chandler, Ltd. 578

L

LaFarge Aluminous Cement Co., Ltd. ... ...
Laidlaw, R., & Son (Edin.), Ltd. ... ...
Lamont, James H., & Co., Ltd. ... ...
Lanarkshire Bolt & Rivet Co., Ltd. ... ...
Lancashire Dynamo & Crypto, Ltd. ... ...
Le Bas Tube Co., Ltd. ... ...
Lionweld, Ltd. 554
Lind, Peter, Ltd. ... ...

M

Macpherson, Donald, & Co., Ltd. ... ...
Magnetic Valve Co., Ltd. ... ...
Main, R. & A., Ltd 594
Marco Conveyor & Engineering Co., Ltd. ... ...
Meltham Silica Fire Brick Co., Ltd. ... ...
Mercol Products, Ltd. ... ...
Messenger & Sons, Ltd. ... ...
Metropolitan Leather Co., Ltd. ... ...
Milnes Meters, Ltd. ... ...
Mitcham Smelters, Ltd. 606
Mitchell, H., & Co. 556
Moler Products, Ltd. ... ...
Monk, A., & Co., Ltd. ... ...
Morgan Crucible Co. Ltd.... 567
Morris Commercial Cars, Ltd. ... ...

N

National Benzole Co., Ltd.... 590
National Enamels, Ltd. ... ...
New Conveyor Co., Ltd., ...
Newton Chambers & Co., Ltd. S1
Norwest Construction & Co., Ltd. ... ...
Nu-Swift, Ltd. 605

O

Oakland Metal Co., Ltd., ...
Olding, Jack, & Co., Ltd. ... ...
Oxley Engineering Co., Ltd. ... ...

P

Parkinson & Cowan (Gas Meters), Ltd. 580
Parkinson Stove Co., Ltd. ... ...
Pass, E., & Co., Ltd. ... ...
Peckett & Sons, Ltd. ... ...
Peebles & Co., Ltd. ... ...
Pegson, Ltd. ... ...
Perl Controls, Ltd. ... ...

PAGE

Plus Gas Co., Ltd. 572
Pollock & Peel, Ltd. ... ...
Power Gas Corporation, Ltd. ... Facing p. 585
Pratt Engineering Co. ... ...
Press, William, & Son, Ltd. ... .
Pulsometer Engineering Co., Ltd. ... ...

R

R.T.S.C. Home Sales Ltd. 573
Radiant Heating, Ltd. ... ...
Radiation, Ltd. 592, 593
Rawlplug Co., Ltd. ... ...
Reavell & Co., Ltd. 604
Remington Rand Ltd., ... S5
Richmond Welding Co. 606
Riley, A. J., & Son, Ltd. ... ...
Roberts, R. E., & Sons, Ltd. 566
Robinson, J. H., & Co. (Liverpool), Ltd. ...
Royles, Ltd. ... ...
Royston, Geo., & Son, Ltd., ...
Russell Bros., (Walsall), Ltd. ... ...
Russell, R., & Sons, Ltd. ... ...

S

Salter, T. E., Ltd. 579
Saunders Valve Co., Ltd. ... ...
Scottish Non-Ferrous Tube Industries, Ltd. ...
Senior Economisers Ltd. ... ...
Service Electric Co., Ltd. ... ...
Siebe Gorman & Co., Ltd.... ... ...
Sigma Instrument Co., Ltd. ... ...
Simon-Carves, Ltd. ... ...
Simon, Richard, & Sons, Ltd. 568
Sisson, W., & Co., Ltd. ... ...
Smith Meters, Ltd. ... ...
Smith, Thos. & Sons (Rodley), Ltd. ... ...
Southalls (Birmingham) Ltd. ... ...
Spence, Peter, & Sons, Ltd. ... ...
Spencer Bonecourt, Ltd. ... ...
Sperryn & Co., Ltd. ... ...
Stanton Ironwork Co., Ltd. ... ...
Staveley Iron & Chemical Co., Ltd. ... ...
Steel Equipment Co., Ltd., ... S9
Stein, John G., & Co., Ltd. ... ...
Stelcon (Industrial Floors), Ltd. 572
Stewart & Gray, Ltd. 608
Stewarts & Lloyds, Ltd. ... ...
Stoves, Ltd. 563
Strachan & Henshaw, Ltd.... ... ...
Stringer Bros. ... ...
Sutcliffe Speakman & Co., Ltd. ... ...
Sutherland, A. G., Ltd. 570

T

Thomas & Bishop, Ltd. ... ...
Thomas (Richard) & Baldwins, Ltd. ... ...
Thompson, John, Conveyor Co. ... ...
Thorp, Thomas, & Co., Ltd. 566
Tubela Engineering Co., Ltd. ... ...
Tucker Eyelet, Geo., Co. Ltd., ...
Tully, Sons & Co., Ltd. ... ...
Turners Asbestos Cement Co., Ltd. ... ...

U

Underpressure Engineering Co., Ltd. 602
United Kingdom Construction & Engineering Co., Ltd. ... ...

V

Vale, Thomas, & Sons, Ltd. 562
Visco Engineering Co., Ltd. 570
Vulcan Stove Co., Ltd. 568

W

Wakefield, C. C., & Co., Ltd. 598
Wakelin, F. H., Ltd. 606
Walker, C. & W., Ltd. ... ...
Walker, Crosweller & Co., Ltd ... ...
Waller, George, & Son, Ltd. ... ...
Ward, Thos. W., Ltd. ... ...
Warsop Power Tools Ltd.... 603
Weatherill, F. E. Ltd., ...
Wellington Tube Works, Ltd ... ...
Wellman Smith Owen Engineering Corpn., Ltd. ...
West's Gas Improvement Co., Ltd. ... Cover III
West Hunwick Silica & Firebrick Co., Ltd. Cover II
West's Piling & Construction Co. 605
Westwood & Wrights, Ltd. ... ...
Whessoe, Ltd. ... ...
Wilkes, A. H., & Co., Ltd. ... ...
Willey & Co., Ltd. ... ...
Williams, John E., Ltd. ... ...
Williamson Cliff, Ltd. ... ...
Wilson, George, Gas Meters, Ltd. ... ...
Winn & Coales, Ltd. 574
Woodall-Duckham Construction Co., Ltd., facing p. 584
Wood, Hugh, & Co., Ltd. ... ...
Wright, Alexander & Co., Ltd. ... .

Y

Yorkshire Copper Works, Ltd. ... ...

Agencies ... ...
Appointments Vacant 605
Appointment Wanted ... ...
Contracts Open ... ...
Educational 606
Fellowship ... ...
Miscellaneous 606
Notice ... ...
Patents ... ...
Plant etc., For Sale and Wanted 606
Publications 606
Repairs ... ...

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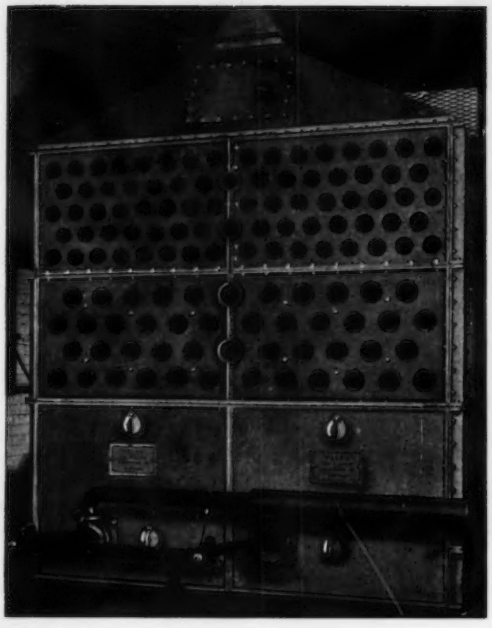

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VOL. 275 NO. 4709 September 2, 1953

CONTENTS

Page

EDITORIAL COMMENT

New Coking Processes ... 581
A Limited Field ... 582
British Productivity Council ... 582
Civil Defence ... 582

PERSONAL ... 583

OBITUARY ... 583

NEWS OF CURRENT EVENTS

1953 Journal Directory ... 583
Firedamp as Town Gas: Drainage of Methane at Haig Colliery, Whitehaven ... 584
Oils and Chemicals from Coal: The Fischer-Tropsch Process ... 591
North Western Extensions and Reconstruction: Progress in the Groups ... 595
Conference on Welded Structures ... 595
Still Going Strong ... 597
William Dieterichs Prize Winner ... 597
Deputy Chairmen of Gas Consultative Councils ... 597
Diary ... 597
Heating up Greenwich Coke Ovens ... 599
Paint Committee Changes ... 599
Coal Mixtures ... 599
Part Time Courses ... 599
Chemical Engineering Pioneer ... 599

TECHNICAL RECORD

The French Gas Association: 70th Congress: Some Abstracts by 'Ashton' ... 585

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VOL. 275. No. 4709 105TH YEAR September 2, 1953

NEW COKING PROCESSES

As we begin to reap the reward of our sins in the wasting of coking coals, as the spectre of coal famine stalks ever nearer, it is inevitable that more and more frantic efforts will be made to produce coke from non-coking coals. On the other hand there are countries the development of whose natural resources is still in the early stages and where deposits of metallic ore are not accompanied by adequate deposits of the necessary solid fuel for the extraction of the metal, particularly iron and steel. These efforts are observed with warm sympathy and appreciation by technicians in more fortunately endowed countries, a sympathy engendered by the knowledge that, even there, similar problems will inevitably arise in the more or less distant future. The desperate seriousness of these problems increases the disappointment that will be felt with the report just issued by the Organisation for European Economic Co-operation (O.E.E.C.). Apart from the generally indigestible nature of the information presented and, except in one case its incompleteness, it is a pity that it is inflated by the inclusion of information about processes for which there is neither economic nor technical justification. We mean processes for the production of solid smokeless fuels from coals which are perfectly good for gas-making.

Most of these merely pander to the special tastes of a relatively small number of consumers who are prepared to pay high prices for a specialised fuel to keep going obsolete methods of space heating. The only process which is described in sufficient detail in the report is the highly specialised Shawinigan travelling grate coke process developed in the United States for and in combination with a rotary lime kiln to produce the coke and lime used in the manufacture of calcium carbide. Even that is padded out with such gratuitious and elementary information as 'Coal carbonisation has been practised for more than 350 years and during that time a number of processes have been developed.'

The coals used are apparently of quite high gas-making quality, with 38% volatiles and less than 4% ash. Here there is no case of using coals unsuitable for the standard method of gas and coke manufacture, but of producing a special form of soft, porous, dry coke (its bulk density is no more than 22 lb./cu.ft.) 'of exceptional merit as a reducing agent' in the electric furnaces used in the production of carbide. That is to say, it has nothing whatever to do with the general run of the fuel situation as it exists today or as it will exist in the not distant future. There is no attempt to obtain coking in the ordinary sense. The coal is fed to a chain grate with a top size of 2 in. and with less than 30% below ¼ in.; and for partial combustion air is supplied at a carefully controlled rate by way of a chamber, arranged below the grate, divided into twelve compartments sealed from one another and each equipped with a valve and indicating flow meter so that the air supplied to each can be accurately adjusted. The coking chamber is under pressure, and therefore the whole unit is enclosed in a steel cover. The idea is to coke the coal by the combustion of a fraction of the volatile matter. There is no agglomeration. The operating temperature is in the range of 1,100° to 1,200°C. 'During normal operation the coal ignites almost at once on entering the chamber. The coal layer, from 3 to 4 in. thick, cokes from the top and down. There is a more or less sharp zone above where the coking is complete and below which the coal is still green. The speed of the grate and the volume of air are so adjusted that the coke is discharged at the moment the zone reaches the grate surface.' At the end of the grate the coke is discharged to a conveyor on which it is quenched. The size is such that no crushing or screening of the material is necessary before feeding it to the electric furnace.

The gases from the top of the grate are taken direct to the rotary lime kiln. They are large in volume but low in calorific value (about 70 B.Th.U. per cu.ft.), being high in nitrogen content (about 70%). Burning in the kiln these gases are found to produce a 'lazy flame' with the production of a lime more suitable to the carbide process than that produced by pulverised coal. They give 'a more soft-burned lime,' as a consequence of which and of the absence of ash 'the lime produced is a pure, white variety of high activity.' The efficiency of the lime-burning is somewhat lower than with the direct combustion of powdered coal, but this is offset by greater steam production by waste heat recovery. The economics of the process are not worked out. Obviously they must cover the whole range of production both of coke and of carbide. The

fact that the company is persevering with it and that it sees possibilities of improvements and developments is an indication that a favourable view is taken of its commercial efficiency.

A LIMITED FIELD

It is significant that the U.S.A. Bureau of Mines is aware of only one plant for medium temperature carbonisation in operation in the United States. This is the Disco process which is making a smokeless domestic fuel for the City of Pittsburg residents where strict smoke abatement laws are in effect. This plant is said to be producing annually 250,000 to 300,000 tons of fuel from bituminous coal of high volatile content (about 37%). Of the British Coalite process nothing need be said here, for the details are so well known. It caters, with commercial success, for what may be described as the luxury market for a clean, smokeless, pleasant looking open fire fuel, made from carefully selected, clean, good gas-making coals. The Carbolux process in France falls in the same class. Several attempts have been and are being made to produce a free-burning domestic coke in coke ovens—with what justification it is difficult to see. The Phurnacite process is sponsored by the National Coal Board in the attempt, more or less successful and wholly praiseworthy, to produce a similar fuel from washed coal fines in the South Wales coalfield. The fines are briquetted with pitch and carbonised. This is by no means the first time that attempts have been made to briquette fine coal with pitch, and in some cases with the addition of coke breeze followed by carbonisation. Some of these attempts have been made in gasworks but none has survived. The briquetting of coke breeze alone with pitch has also been practised with some success, but we doubt whether any of these plants are continuing in economic operation.

Other processes mentioned in the report are aimed at producing coke from such more or less unpromising materials as Yugoslav lignite, and the low-grade coals of Latin America. And finally there are the attempts at the electrical processes of Norway, applied in such instances as the coking of 'highly volatile, bituminous coals, unsuitable for coking, from Spitzbergen.' A number of proposals have been put forward for the more or less direct internal heating, by electricity, of a charge of coal in a vertical retort. All fall down on the cost of the current, which limits the economic possibility of such processes to situations where electrical energy is available at very low cost indeed. On the whole this report does not indicate that there are any methods of widening the range of cokeable coals on a big scale likely to supersede the well-known processes of briquetting or of stamped charges to coke ovens, both with blending in carefully selected varieties and proportions.

BRITISH PRODUCTIVITY COUNCIL

From the mid 18th century to 1900, the industry of this country led the world in productive efficiency and, in consequence, the British people had then better general living conditions than any other nation, low as that level was in comparison with present standards. Since then, the British annual increase in productivity has been only half that achieved by some other countries, and the result is that our position will grow relatively worse until we reverse this trend. This gloomy fact is the *raison d'être* of the British Productivity Council, of 21, Tothill Street, S.W.1, whose aims and ambitions we have been hearing in a new policy and programme booklet. The Council, which is non-political and has no executive powers, was formed in 1952 and announced its objects at a conference held in London last March. Its programme is based on two important lessons derived from the experience of the Council's predecessor, the U.K. Section of the Anglo-American Council on Productivity. The first concerns the benefits to be won by employers and trade union leaders getting together with the common object of increasing productivity and efficiency in industry as a whole, and the second lesson is of the value to be derived from the promotion of exchanges of information and experience between firms not only in the same but in different industries.

The Council, believing that there is great scope for enlisting local enthusiasm in the cause of higher productivity, is recommending the setting up of local productivity committees of employers and trade union officials, as well as those concerned with education, and members of the local branches of professional institutions, in more than a hundred towns and districts throughout the country. Further, it is instituting a circuit scheme for exchange of team visits, the teams to consist of two members drawn from management or supervisors, two members from workshop level. It is also making a series of instructional films on productivity subjects. By this means the Council hopes to improve the productive efficiency of British industry on which our standard of living depends. In our own interests, therefore, we must wish them all success.

CIVIL DEFENCE

The gas industry, as one of the nationalised industries, is concerned for the first time with new civil defence plans announced in *Civil Defence Industrial Bulletin No. 2*, which describes the organisation of the industrial civil defence service and defines its relations with the Civil Defence Corps, organised by local authorities. The Queen has approved two badges for the new service, one for England and Wales, and one for Scotland, in cloth for use on uniforms and in metal to be worn with civilian dress. It will be for managements to decide whether to provide uniforms, but if they do they must be of given standards. Membership of the service will be limited to units formed in compliance with the instructions published in industrial civil defence bulletins, and authority to wear the badge will be given in a certificate issued to the unit by the Home Secretary or the Secretary of State for Scotland. The plans apply to factories, shops, and business premises, including Government departments and the premises of nationalised industries, employing more than 200 people in any one establishment.

Managements are invited to apply for membership as soon as responsible officers have been appointed for their civil defence arrangements. The bulletin suggests that organisation of units should follow closely that of a local division of the Civil Defence Corps. Industrial units must work with the local authority civil defence controller, as local divisions of the Civil Defence Corps do. It is suggested that representatives of industry should be consulted to see how industrial units can best be fitted into the existing scheme and what changes in operational boundaries may be necessary. Local authorities are responsible for co-ordination, and corps authorities are asked to report progress every half-year. The bulletin suggests that industrial units should be grouped where practicable and that each group should cover an area roughly equal to that covered by a warden's post.

Personal Notes

MR. PE[illegible], of the *Gas Journal*, was on A[illegible] presented with a son.

MR. A[illegible]NNEDY, Sales Manager of G. L. F[illegible]n & Co., Ltd., has been appointed a [illegible]irector of that company.

MR. G. J. RIMMER has been appointed Engineer and Manager of the Hinckley District, West Midlands Gas Board. Prior to his appointment he was Deputy Engineer and Manager at Hinckley.

MR. F. W. MILNER, Chief Draughtsman with Tully, Sons & Co., Ltd., Newark, engineers and contractors, has completed 25 years service with the company. At a dinner given by the directors in his honour, Mr. Milner was presented with a gold watch to commemorate the occasion.

SIR ERNEST SMITH, C.B.E., has been re-appointed Chairman of the Industrial Coal Consumers' Council, a position he has held since the Council's formation. MR. T. WILLIAMSON, C.B.E., Vice-Chairman of the National Joint Industrial Council for the Gas Industry, has also been re-appointed a member of the Council.

MR. G. C. WOOD has been appointed Manager of the Galashiels Sub-Group of the Scottish Gas Board, succeeding MR. W. C. CAMPBELL, who has been posted to the District Managership at Paisley. Mr. Wood's present post of District Manager at Grangemouth is to be filled by MR. T. R. CAMERON, who has been Deputy Manager at Galashiels since 1950. Mr. Wood received his early training at Dunfermline. After the war, during which he served as a Major with the Royal Engineers in the Middle East, he became senior assistant to the engineer and manager at Dunfermline and was appointed District Manager at Grangemouth in 1950.

MR. G. H. KENYON, Manager of the Medway Group, Kent County Division, has been seconded to work with the Personnel Manager of the South Eastern Gas Board at Katharine Street, Croydon. MR. J. D. C. WOODALL, Manager of the Maidstone Group, has been appointed Acting Sales and Service Manager of the Kent County Division. While these temporary arrangements continue Mr. Kenyon and Mr. Woodall will cease to act as Group Managers; the engineering officers of the Groups will answer directly to Mr. J. W. Townsend, Divisional Engineer, and the sales and service officers directly to Mr. J. D. C. Woodall, the Acting Divisional Sales and Service Manager.

MR. R. W. E. GASKIN has retired from the Board of Smith Meters, Ltd. He is continuing with the company in the capacity of Consultant. Mr. Gaskin has spent 53 years in the gas meter industry, joining the Smith Meter organisation in 1915. In 1927 he was appointed Works Manager. Together with the late E. W. Smith and the late A. Charles, M.B.E., he was responsible for the introduction of the small high capacity type of gas meter, which incorporated the basic fundamental principles on which the present-day meter is founded. In 1941 Mr. Gaskin was appointed Director of Smith Meters, Ltd., controlling the Kennington Works organisation. As a mark of esteem his fellow directors have presented him with a gold wrist watch on his retirement.

MR. A. FACER, Manager, Derby Sub-Division, East Midlands Gas Board, has been appointed General Manager and Engineer of the Pontypool undertaking, to succeed Mr. J. Powdrill, who took up his appointment as General Manager and Engineer of the Cardiff undertaking as from September 1. Mr. Facer entered the gas industry in 1926, serving an apprenticeship with West's Gas Improvement Co., Ltd., Manchester. From 1934 to 1937 he was with the Bristol Gas Company, and in 1938 he was appointed Chief Technical Assistant to the Greenock undertaking. In 1939 he took up the position of Deputy Engineer and Manager at Carlisle. In 1945 he became Deputy Engineer and Manager of the Paisley Gas Department, and in 1947 was appointed General Manager and Engineer at Hereford. Mr. Facer became Manager of the Derby Sub-Division of the East Midlands Gas Board in 1949. He is a member of the Management Committee of the Midland Section of the Institution of Gas Engineers.

MR. H. NORMAN G. ALLEN has been re-elected Chairman of the Council of the British Internal Combustion Engine Research Association for the current year.

Mr. F. L. SCAIFE, General Manager of the Stockton Division of the Northern Gas Board, will retire at the end of the present financial year. At that date the Stockton and Middlesbrough Divisions will be merged and the new Division so formed will be known as the Tees-side Division. Mr. J. W. PALLISTER, General Manager of the Middlesbrough Division, will become General Manager of the Tees-side Division.

MR JAMES HARRISON, Deputy President and Secretary of the National Gas Association of Australia, will retire in November after serving the Association for 29 years. He entered the gas industry in 1924 and when the Gas Companies' Association of Australia was subsequently formed he became its Secretary. In collaboration with the late Mr. P. C. Holmes Hunt he brought about the amalgamation of the Victorian Gas Managers' Association and the New South Wales and Queensland Gas Institute, forming the Australian Gas Institute, of which he was first General Secretary, a position he still holds. After the Gas Companies' Association had functioned for some years the need for an organisation with wider objectives became manifest. The National Gas Association of Australia was therefore formed, with Mr Harrison as its first Deputy President and Secretary. To succeed Mr. Harrison MR. PAUL FREADMAN has been appointed Manager-Secretary.

Obituary

MR. ARTHUR PEAKE-JONES, Advertising Manager of the British Tyre and Rubber Co., Ltd., died on August 14 after several months' illness. He was appointed Advertising Manager of the B.T.R. in 1931.

MR. JAMES MILLER THOMSON, W.S., formerly Chairman of Alder & Mackay, Ltd., New Grange Works, Edinburgh, and associated companies, died at his home in Edinburgh on August 15, aged 81 years.

MR. H. W. BARNES, London Director and Manager of the Oxley Engineering Co., Ltd., died as the result of a motor accident on August 21. Mr. Barnes was also on the boards of Asbestos and Engineering Products and Thomas Dryden and Sons, Ltd.

1953 'Journal' Directory

THE following changes have been notified during the past month. To keep the information in the 1953 edition of the *Gas Journal Calendar and Directory* up to date readers are invited to note these alterations (together with the appropriate adjustments relating thereto in the 'Personnel' section of the *Directory*, p.p. 141-156):

Page 25.—SOUTHERN GAS CONSULTATIVE COUNCIL: F. C. Rea, O.B.E., *Chairman*, vice Alderman J. W. Moore, C.B.E., retired.

Page 31.—DERBY: Delete A. Facer, *Sub.-Div. M.*, removed.

Page 37.—EASTERN GAS BOARD: Add E. Walker, M.C., *Part Time Member*.

Page 79.—SOUTH EASTERN GAS BOARD: *Deputy Commercial Manager*, L. F. Randall. *Manager, Special Service Section*, E. Wulstan Atkins, vice L. F. Randall.

Pages 80 and 84.—EAST SURREY DIVISION: *Div. Sales and Service M.*, R. M. Munns, vice E. Wulstan Atkins.

Pages 81 and 85.—KENT COUNTY DIVISION: *Div. Sales and Services M.*, delete R. M. Munns.

Page 97.—SOUTHERN GAS BOARD: F. C. Rea, O.B.E., vice Alderman J. W. Moore, C.B.E. (*Chairman of Consultative Council, ex officio*). Add Sir Wallace Akers, C.B.E., *Part Time Member*.

Page 101.—PORTSMOUTH, GOSPORT, AND BOGNOR REGIS: Delete A. J. Privett, *Sales Manager*, deceased.

Page 107. — PONTYPOOL: A. Facer, *G.M. & E.*, vice J. Powdrill. M.B.E.

Page 109.—LLANELLY AND GOWERTON: Delete A. Pickard, *E., M., & S.* (with effect from January 1, 1954).

Page 109.—SWANSEA: A. Pickard, *E., M., & S.*, vice E. Ablett, O.B.E., retired (with effect from January 1, 1954).

Page 116.—WARWICKSHIRE: B. G. H. J. Hawkings (formerly Distribution Superintendent, Plymouth Group), *Div. Distributing E.*, vice F. A. C. Pykett. A. W. Wren, *Div. Coke Officer*.

Page 119.—HINCKLEY: G. J. Rimmer, *E. & M.*, vice A. B. Britton.

Page 125.—GALASHIELS: G. C. Wood, *Sub-Group M.*, vice W. C. Campbell.

Page 125. — GRANGEMOUTH: T. R. Cameron, *Dist. M.*, vice G. C. Wood, removed.

Slow Recovery in the North West

THE North Western Gas Board's *Bulletin* for the June quarter of 1953 reports a moderate recovery of gas sales from the low levels reached in the June quarter of 1952. The improvement was substantially less than that experienced by the gas industry as a whole in the same period, and the after-effects in the north-west of the 1952 cotton recession are blamed for this.

During the three months ended June 28, 1953, the North Western Gas Board produced and purchased for resale an average of 1,460 mill. cu.ft. of gas per week. This was about 0.9% more than in the corresponding period of 1952, and compared with an increase of 3.1% in the industry as a whole.

It is pointed out that activity in the cotton industry, which is a major influence on purchasing power in the north-west, has only recently recovered from the slump of 1952. The March, 1953, total of cotton yarn output, states the *Bulletin*, was the first to exceed the level of the previous year since the onset of the recession in the spring of 1952, and some time is bound to elapse before this improvement is fully reflected in the incomes of gas consumers.

Coke Sales

Coke sales during the June quarter averaged 23,600 tons per week, an increase of 3.8% compared with the corresponding period of 1952. Available information indicates that the increase was mainly in sales to distributors. These were 4.4% higher in the 12 weeks ended June 14, 1953, than in the same period last year. There was also a substantial rise in direct sales to consumers, and particularly in domestic sales, which were up by 8.6% in this period.

Coke stocks at the end of June, at 372,000 tons, were about double the corresponding figure for the previous year, but the gap was considerably narrowed since the end of March when stocks were four and a half times higher than at the same time last year. Consumers have been advised to order now rather than wait for the winter when pressure on coke supplies and on available transport is likely to be heavy.

The value of domestic appliances sold in the quarter was £816,200 and was 1.7% higher than in the corresponding period of 1952.

Demand for Cookers

Analysis of figures for individual appliances shows the same marked difference, noted in 1952-53, between sales of appliances subject to purchase tax and hire purchase restrictions and sales of other appliances. Compared with the June quarter of 1952 sales of appliances subject to tax and to hire purchase restrictions were down by 0.5%, while sales of cookers, which are exempt from both, increased by 2.6%.

Referring to the recent announcement that the gap between the price of high grade and low grade coals is to be increased, the *Bulletin* suggests that if the new prices prove adequate in differentiating between the various grades, they should help to ensure a steady supply of high grade coal to the gas industry and thereby also a dependable supply of coke to the industry's consumers.

Local Committees and Gas Prices

THE position of local committees in relation to the Gas Consultative Council on matters of major policy was again raised at a meeting of the West Midlands Gas Consultative Council at Birmingham on August 17 under the chairmanship of Alderman W. H. Malcolm (Coventry). On behalf of the Worcestershire and Herefordshire local committee a resolution was submitted asking for reconsideration of the decision reached some time ago about local committees, and asking that these should be taken into consultation on questions of tariff changes in the charges for gas.

Alderman W. Pigott (Hereford) raised the subject on behalf of his district and said the members of his committee held strong views about the matter. It was felt that when changes were made in the price structure members of local committees had no say and it was strongly held that they should be called into conference before decisions were reached. Local committees represented consumers and there should be opportunity to make their views known.

The Chairman said this matter had been discussed on previous occasions and it was then pointed out and confirmed by the Ministry that that council was the only constitutional body to meet the Board on such matters as price policy. There was no obligation on the part of the Board to come to them, but it did so. That was the position as laid down by the Act.

Alderman F. Williams (Stoke) said it was recognised that they had got to have new tariffs whether they liked it or not, but it was felt that as the local committees represented consumers they ought to be able to express what was thought about it.

The Chairman pointed out that the local committees were well represented on that council. They were in fact sub-committees of that body and could bring any complaint or suggestion about consumers' interests to that body. All details were available to local committees. Every time the Chairman of the Board made a statement of policy that was read to local committees and figures were given.

Councillor H. J. Paramore said the local committees felt that all they were called upon to do was to carry out the wishes of the Consultative Council and feeling was such that he was sure the matter would be brought up again.

At the request of the Lichfield branch of the Women's Gas Federation a lecturer was sent to explain the price situation. Members, it was said, much appreciated this, but still held the view that gas prices were too high.

At the end of the meeting it was again suggested that local committees should have more to do as some business men felt that their time was wasted unless there was really pertinent business to be transacted. This prompted the retort that perhaps they had too many local committees or that as they did not get complaints from consumers it must be taken there was nothing to watch.

Bright Ideas

FOR many years the North Thames Gas Board has encouraged employees to put forward suggestions for the more efficient working of the Board, and since the war nearly 1,000 suggestions have been received. During the past 12 months more than 150 have been submitted to the Awards Committee (which has among its members representatives of both the management and the employees) for consideration, and 70 of these suggestions were regarded as being worthy of a cash award in view of their originality and usefulness.

At a recent ceremony held at the Board's chief office, Mr. M. Milne-Watson, Chairman, presented cash awards to those employees whose bright ideas had been accepted for recognition at a recent meeting of the Awards Committee.

These employees were: T. Beckerleg (Kensal Green), A. J. Blake and D. E. Durrant (Beckton), R. Mills, G. Mackenzie, and C. T. Paque (Products Works, Beckton), J. Ford and H. Paley (Brentford), C. A. Gilbert (Southend), C. J. Hurlin (Bromley), F. Ellender, B. H. Hare, and J. G. W. Gray (Harwood Terrace), C. Groves and W. Hepplewhite (Uxbridge), S. Tipper (Chiswick), A. Robson (Pound Lane), and R. Johnston (Harrow).

Gas in Bulk to Great Dunmow

THE Eastern Gas Board's Tottenham Division Magazine, *T.D. News*, announces that the Tottenham mains department will shortly start laying 3½ miles of 4-in. main to supply gas in bulk to Great Dunmow on the Ipswich Division. From Mr. E. O. Rose, Tottenham Division Engineer, it is learnt that Eastern Gas Board has approved the provision of a bulk supply of gas to Dunmow from Bishop's Stortford.

Dunmow works, which makes about 16 mill. cu.ft. per year, will be closed down, probably during the summer of 1954. Bishop's Stortford's mains system already goes as far as Takeley, which is more than half-way to Dunmow, and the new main will connect between Takeley and Dunmow.

There are three holders at Dunmow works, the largest, a two-lift spiral, being of 100,000 cu.ft. capacity. Another holder is of 30,000 cu.ft., and there is a smaller holder which is not in use. The piped supply from Bishop's Stortford will feed into the largest holder. Dunmow's maximum demand is about 60,000 cu.ft. a day, which will mean an additional 6% output for the Bishop's Stortford works.

It has not yet been decided whether Dunmow district will be transferred to Tottenham Division or whether it will remain part of Ipswich Division. A glance at the Tottenham Division map shows that Dunmow is barely two miles outside the Tottenham boundary.

Leak Clamps for Mains.—The Consolidated Pneumatic Tool Co., Ltd., of 232, Dawes Road, London, S.W.6, have appointed Abbott Birks & Co., Ltd., of 90-91, Blackfriars Road, London, S.E.1, as sole distributors in the United Kingdom for their adjustable leak clamps. These leak clamps have been manufactured in Britain for many years, and over 50,000 of them have been supplied to the gas industry during the past 15 years.

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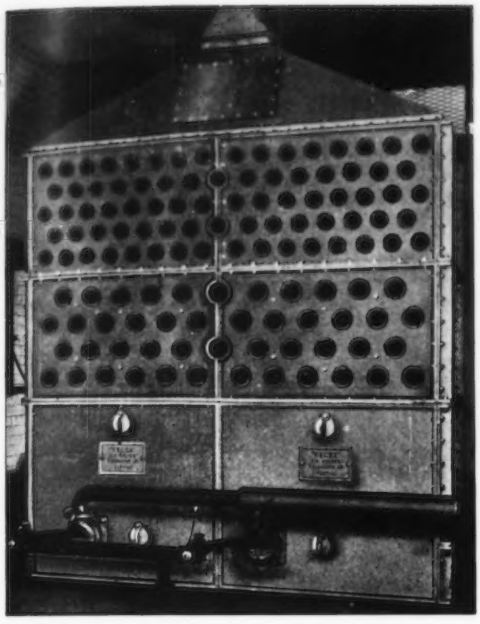

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Gas Journal

105th YEAR OF PUBLICATION

EDITOR: NORMAN S. SMITH, B.Sc. (Gas Eng.)

11, BOLT COURT, FLEET ST., LONDON, E.C.4. Telephone: CENtral 2236-7 Telegrams: Gasking, Fleet.

VOL. 275 NO. 4709 September 2, 1953

CONTENTS

Page

EDITORIAL COMMENT

New Coking Processes ... 581
A Limited Field ... 582
British Productivity Council ... 582
Civil Defence ... 582

PERSONAL ... 583

OBITUARY ... 583

NEWS OF CURRENT EVENTS

1953 Journal Directory ... 583
Firedamp as Town Gas: Drainage of Methane at Haig Colliery, Whitehaven ... 584
Oils and Chemicals from Coal: The Fischer-Tropsch Process ... 591
North Western Extensions and Reconstruction: Progress in the Groups ... 595
Conference on Welded Structures ... 595
Still Going Strong ... 597
William Dieterichs Prize Winner ... 597
Deputy Chairmen of Gas Consultative Councils ... 597
Diary ... 597
Heating up Greenwich Coke Ovens ... 599
Paint Committee Changes ... 599
Coal Mixtures ... 599
Part Time Courses ... 599
Chemical Engineering Pioneer ... 599

TECHNICAL RECORD

The French Gas Association: 70th Congress: Some Abstracts by 'Ashton' ... 585

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VOL. 275. No. 4709 105TH YEAR September 2, 1953

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As we begin to reap the reward of our sins in the wasting of coking coals, as the spectre of coal famine stalks ever nearer, it is inevitable that more and more frantic efforts will be made to produce coke from non-coking coals. On the other hand there are countries the development of whose natural resources is still in the early stages and where deposits of metallic ore are not accompanied by adequate deposits of the necessary solid fuel for the extraction of the metal, particularly iron and steel. These efforts are observed with warm sympathy and appreciation by technicians in more fortunately endowed countries, a sympathy engendered by the knowledge that, even there, similar problems will inevitably arise in the more or less distant future. The desperate seriousness of these problems increases the disappointment that will be felt with the report just issued by the Organisation for European Economic Co-operation (O.E.E.C.). Apart from the generally indigestible nature of the information presented and, except in one case its incompleteness, it is a pity that it is inflated by the inclusion of information about processes for which there is neither economic nor technical justification. We mean processes for the production of solid smokeless fuels from coals which are perfectly good for gas-making.

Most of these merely pander to the special tastes of a relatively small number of consumers who are prepared to pay high prices for a specialised fuel to keep going obsolete methods of space heating. The only process which is described in sufficient detail in the report is the highly specialised Shawinigan travelling grate coke process developed in the United States for and in combination with a rotary lime kiln to produce the coke and lime used in the manufacture of calcium carbide. Even that is padded out with such gratuitious and elementary information as 'Coal carbonisation has been practised for more than 350 years and during that time a number of processes have been developed.'

The coals used are apparently of quite high gas-making quality, with 38% volatiles and less than 4% ash. Here there is no case of using coals unsuitable for the standard method of gas and coke manufacture, but of producing a special form of soft, porous, dry coke (its bulk density is no more than 22 lb./cu.ft.) 'of exceptional merit as a reducing agent' in the electric furnaces used in the production of carbide. That is to say, it has nothing whatever to do with the general run of the fuel situation as it exists today or as it will exist in the not distant future. There is no attempt to obtain coking in the ordinary sense. The coal is fed to a chain grate with a top size of 2 in. and with less than 30% below ¼ in.; and for partial combustion air is supplied at a carefully controlled rate by way of a chamber, arranged below the grate, divided into twelve compartments sealed from one another and each equipped with a valve and indicating flow meter so that the air supplied to each can be accurately adjusted. The coking chamber is under pressure, and therefore the whole unit is enclosed in a steel cover. The idea is to coke the coal by the combustion of a fraction of the volatile matter. There is no agglomeration. The operating temperature is in the range of 1,100° to 1,200°C. 'During normal operation the coal ignites almost at once on entering the chamber. The coal layer, from 3 to 4 in. thick, cokes from the top and down. There is a more or less sharp zone above where the coking is complete and below which the coal is still green. The speed of the grate and the volume of air are so adjusted that the coke is discharged at the moment the zone reaches the grate surface.' At the end of the grate the coke is discharged to a conveyor on which it is quenched. The size is such that no crushing or screening of the material is necessary before feeding it to the electric furnace.

The gases from the top of the grate are taken direct to the rotary lime kiln. They are large in volume but low in calorific value (about 70 B.Th.U. per cu.ft.), being high in nitrogen content (about 70%). Burning in the kiln these gases are found to produce a 'lazy flame' with the production of a lime more suitable to the carbide process than that produced by pulverised coal. They give 'a more soft-burned lime,' as a consequence of which and of the absence of ash 'the lime produced is a pure, white variety of high activity.' The efficiency of the lime-burning is somewhat lower than with the direct combustion of powdered coal, but this is offset by greater steam production by waste heat recovery. The economics of the process are not worked out. Obviously they must cover the whole range of production both of coke and of carbide. The

fact that the company is persevering with it and that it sees possibilities of improvements and developments is an indication that a favourable view is taken of its commercial efficiency.

A LIMITED FIELD

It is significant that the U.S.A. Bureau of Mines is aware of only one plant for medium temperature carbonisation in operation in the United States. This is the Disco process which is making a smokeless domestic fuel for the City of Pittsburg residents where strict smoke abatement laws are in effect. This plant is said to be producing annually 250,000 to 300,000 tons of fuel from bituminous coal of high volatile content (about 37%). Of the British Coalite process nothing need be said here, for the details are so well known. It caters, with commercial success, for what may be described as the luxury market for a clean, smokeless, pleasant looking open fire fuel, made from carefully selected, clean, good gas-making coals. The Carbolux process in France falls in the same class. Several attempts have been and are being made to produce a free-burning domestic coke in coke ovens—with what justification it is difficult to see. The Phurnacite process is sponsored by the National Coal Board in the attempt, more or less successful and wholly praiseworthy, to produce a similar fuel from washed coal fines in the South Wales coalfield. The fines are briquetted with pitch and carbonised. This is by no means the first time that attempts have been made to briquette fine coal with pitch, and in some cases with the addition of coke breeze followed by carbonisation. Some of these attempts have been made in gasworks but none has survived. The briquetting of coke breeze alone with pitch has also been practised with some success, but we doubt whether any of these plants are continuing in economic operation.

Other processes mentioned in the report are aimed at producing coke from such more or less unpromising materials as Yugoslav lignite, and the low-grade coals of Latin America. And finally there are the attempts at the electrical processes of Norway, applied in such instances as the coking of 'highly volatile, bituminous coals, unsuitable for coking, from Spitzbergen.' A number of proposals have been put forward for the more or less direct internal heating, by electricity, of a charge of coal in a vertical retort. All fall down on the cost of the current, which limits the economic possibility of such processes to situations where electrical energy is available at very low cost indeed. On the whole this report does not indicate that there are any methods of widening the range of cokeable coals on a big scale likely to supersede the well-known processes of briquetting or of stamped charges to coke ovens, both with blending in carefully selected varieties and proportions.

BRITISH PRODUCTIVITY COUNCIL

From the mid 18th century to 1900, the industry of this country led the world in productive efficiency and, in consequence, the British people had then better general living conditions than any other nation, low as that level was in comparison with present standards. Since then, the British annual increase in productivity has been only half that achieved by some other countries, and the result is that our position will grow relatively worse until we reverse this trend. This gloomy fact is the *raison d'être* of the British Productivity Council, of 21, Tothill Street, S.W.1, whose aims and ambitions we have been studying in a new policy and programme booklet. The Council, which is non-political and has no executive powers, was formed in 1952 and announced its objects at a conference held in London last March. Its programme is based on two important lessons derived from the experience of the Council's predecessor, the U.K. Section of the Anglo-American Council on Productivity. The first concerns the benefits to be won by employers and trade union leaders getting together with the common object of increasing productivity and efficiency in industry as a whole, and the second lesson is of the value to be derived from the promotion of exchanges of information and experience between firms not only in the same but in different industries.

The Council, believing that there is great scope for enlisting local enthusiasm in the cause of higher productivity, is recommending the setting up of local productivity committees of employers and trade union officials, as well as those concerned with education, and members of the local branches of professional institutions, in more than a hundred towns and districts throughout the country. Further, it is instituting a circuit scheme for exchange of team visits, the teams to consist of two members drawn from management or supervisors, two members from workshop level. It is also making a series of instructional films on productivity subjects. By this means the Council hopes to improve the productive efficiency of British industry on which our standard of living depends. In our own interests, therefore, we must wish them all success.

CIVIL DEFENCE

The gas industry, as one of the nationalised industries, is concerned for the first time with new civil defence plans announced in *Civil Defence Industrial Bulletin No. 2*, which describes the organisation of the industrial civil defence service and defines its relations with the Civil Defence Corps, organised by local authorities. The Queen has approved two badges for the new service, one for England and Wales, and one for Scotland, in cloth for use on uniforms and in metal to be worn with civilian dress. It will be for managements to decide whether to provide uniforms, but if they do they must be of given standards. Membership of the service will be limited to units formed in compliance with the instructions published in industrial civil defence bulletins, and authority to wear the badge will be given in a certificate issued to the unit by the Home Secretary or the Secretary of State for Scotland. The plans apply to factories, shops, and business premises, including Government departments and the premises of nationalised industries, employing more than 200 people in any one establishment.

Managements are invited to apply for membership as soon as responsible officers have been appointed for their civil defence arrangements. The bulletin suggests that organisation of units should follow closely that of a local division of the Civil Defence Corps. Industrial units must work with the local authority civil defence controller, as local divisions of the Civil Defence Corps do. It is suggested that representatives of industry should be consulted to see how industrial units can best be fitted into the existing scheme and what changes in operational boundaries may be necessary. Local authorities are responsible for co-ordination, and corps authorities are asked to report progress every half-year. The bulletin suggests that industrial units should be grouped where practicable and that each group should cover an area roughly equal to that covered by a warden's post.

Personal Notes

MR. PHILIP KING, of the *Gas Journal*, was on August 28 presented with a son.

MR. ALEX. KENNEDY, Sales Manager of G. L. Howarth & Co., Ltd., has been appointed a Director of that company.

MR. G. J. RIMMER has been appointed Engineer and Manager of the Hinckley District, West Midlands Gas Board. Prior to his appointment he was Deputy Engineer and Manager at Hinckley.

MR. F. W. MILNER, Chief Draughtsman with Tully, Sons & Co., Ltd., Newark, engineers and contractors, has completed 25 years service with the company. At a dinner given by the directors in his honour, Mr. Milner was presented with a gold watch to commemorate the occasion.

SIR ERNEST SMITH, C.B.E., has been re-appointed Chairman of the Industrial Coal Consumers' Council, a position he has held since the Council's formation. MR. T. WILLIAMSON, C.B.E., Vice-Chairman of the National Joint Industrial Council for the Gas Industry, has also been re-appointed a member of the Council.

MR. G. C. WOOD has been appointed Manager of the Galashiels Sub-Group of the Scottish Gas Board, succeeding MR. W. C. CAMPBELL, who has been posted to the District Managership at Paisley. Mr. Wood's present post of District Manager at Grangemouth is to be filled by MR. T. R. CAMERON, who has been Deputy Manager at Galashiels since 1950. Mr. Wood received his early training at Dunfermline. After the war, during which he served as a Major with the Royal Engineers in the Middle East, he became senior assistant to the engineer and manager at Dunfermline and was appointed District Manager at Grangemouth in 1950.

MR. G. H. KENYON, Manager of the Medway Group, Kent County Division, has been seconded to work with the Personnel Manager of the South Eastern Gas Board at Katharine Street, Croydon. MR. J. D. C. WOODALL, Manager of the Maidstone Group, has been appointed Acting Sales and Service Manager of the Kent County Division. While these temporary arrangements continue Mr. Kenyon and Mr. Woodall will cease to act as Group Managers; the engineering officers of the Groups will answer directly to Mr. J. W. Townsend, Divisional Engineer, and the sales and service officers directly to Mr. J. D. C. Woodall, the Acting Divisional Sales and Service Manager.

MR. R. W. E. GASKIN has retired from the Board of Smith Meters, Ltd. He is continuing with the company in the capacity of Consultant. Mr. Gaskin has spent 53 years in the gas meter industry, joining the Smith Meter organisation in 1915. In 1927 he was appointed Works Manager. Together with the late E. W. Smith and the late A. Charles, M.B.E., he was responsible for the introduction of the small high capacity type of gas meter, which incorporated the basic fundamental principles on which the present-day meter is founded. In 1941 Mr. Gaskin was appointed Director of Smith Meters, Ltd., controlling the Kennington Works organisation. As a mark of esteem his fellow directors have presented him with a gold wrist watch on his retirement.

MR. A. FACER, Manager, Derby Sub-Division, East Midlands Gas Board, has been appointed General Manager and Engineer of the Pontypool undertaking, to succeed Mr. J. Powdrill, who took up his appointment as General Manager and Engineer of the Cardiff undertaking as from September 1. Mr. Facer entered the gas industry in 1926, serving an apprenticeship with West's Gas Improvement Co., Ltd., Manchester. From 1934 to 1937 he was with the Bristol Gas Company, and in 1938 he was appointed Chief Technical Assistant to the Greenock undertaking. In 1939 he took up the position of Deputy Engineer and Manager at Carlisle. In 1945 he became Deputy Engineer and Manager of the Paisley Gas Department, and in 1947 was appointed General Manager and Engineer at Hereford. Mr. Facer became Manager of the Derby Sub-Division of the East Midlands Gas Board in 1949. He is a member of the Management Committee of the Midland Section of the Institution of Gas Engineers.

MR. H. NORMAN G. ALLEN has been re-elected Chairman of the Council of the British Internal Combustion Engine Research Association for the current year.

Mr. F. L. SCAIFE, General Manager of the Stockton Division of the Northern Gas Board, will retire at the end of the present financial year. At that date the Stockton and Middlesbrough Divisions will be merged and the new Division so formed will be known as the Tees-side Division. Mr. J. W. PALLISTER, General Manager of the Middlesbrough Division, will become General Manager of the Tees-side Division.

MR JAMES HARRISON, Deputy President and Secretary of the National Gas Association of Australia, will retire in November after serving the Association for 29 years. He entered the gas industry in 1924 and when the Gas Companies' Association of Australia was subsequently formed he became its Secretary. In collaboration with the late Mr. P. C. Holmes Hunt he brought about the amalgamation of the Victorian Gas Managers' Association and the New South Wales and Queensland Gas Institute, forming the Australian Gas Institute, of which he was first General Secretary, a position he still holds. After the Gas Companies' Association had functioned for some years the need for an organisation with wider objectives became manifest. The National Gas Association of Australia was therefore formed, with Mr Harrison as its first Deputy President and Secretary. To succeed Mr. Harrison MR. PAUL FREADMAN has been appointed Manager-Secretary.

Obituary

MR. ARTHUR PEAKE-JONES, Advertising Manager of the British Tyre and Rubber Co., Ltd., died on August 14 after several months' illness. He was appointed Advertising Manager of the B.T.R. in 1931.

MR. JAMES MILLER THOMSON, W.S., formerly Chairman of Alder & Mackay, Ltd., New Grange Works, Edinburgh, and associated companies, died at his home in Edinburgh on August 15, aged 81 years.

MR. H. W. BARNES, London Director and Manager of the Oxley Engineering Co., Ltd., died as the result of a motor accident on August 21. Mr. Barnes was also on the boards of Asbestos and Engineering Products and Thomas Dryden and Sons, Ltd.

1953 'Journal' Directory

THE following changes have been notified during the past month. To keep the information in the 1953 edition of the *Gas Journal Calendar and Directory* up to date readers are invited to note these alterations (together with the appropriate adjustments relating thereto in the 'Personnel' section of the *Directory*, p.p. 141-156):

Page 25.—SOUTHERN GAS CONSULTATIVE COUNCIL: F. C. Rea, O.B.E., *Chairman*, vice Alderman J. W. Moore, C.B.E., retired.

Page 31.—DERBY: Delete A. Facer, *Sub.-Div. M.*, removed.

Page 37.—EASTERN GAS BOARD: Add E. Walker, M.C., *Part Time Member*.

Page 79.—SOUTH EASTERN GAS BOARD: *Deputy Commercial Manager*, L. F. Randall. *Manager, Special Service Section*, E. Wulstan Atkins, vice L. F. Randall.

Pages 80 and 84.—EAST SURREY DIVISION: *Div. Sales and Service M.*, R. M. Munns, vice E. Wulstan Atkins.

Pages 81 and 85.—KENT COUNTY DIVISION: *Div. Sales and Services M.*, delete R. M. Munns.

Page 97.—SOUTHERN GAS BOARD: F. C. Rea, O.B.E., vice Alderman J. W. Moore, C.B.E. (*Chairman of Consultative Council, ex officio*). Add Sir Wallace Akers, C.B.E., *Part Time Member*.

Page 101.—PORTSMOUTH, GOSPORT, AND BOGNOR REGIS: Delete A. J. Privett, *Sales Manager*, deceased.

Page 107. — PONTYPOOL: A. Facer, *G.M. & E.*, vice J. Powdrill. M.B.E.

Page 109.—LLANELLY AND GOWERTON: Delete A. Pickard, *E., M., & S.* (with effect from January 1, 1954).

Page 109.—SWANSEA: A. Pickard, *E., M., & S.*, vice E. Ablett, O.B.E., retired (with effect from January 1, 1954).

Page 116.—WARWICKSHIRE: B. G. H. J. Hawkings (formerly Distribution Superintendent, Plymouth Group), *Div. Distributing E.*, vice F. A. C. Pykett. A. W. Wren, *Div. Coke Officer*.

Page 119.—HINCKLEY: G. J. Rimmer, *E. & M.*, vice A. B. Britton.

Page 125.—GALASHIELS: G. C. Wood, *Sub-Group M.*, vice W. C. Campbell.

Page 125. — GRANGEMOUTH: T. R. Cameron, *Dist. M.*, vice G. C. Wood, removed.

Firedamp as Town Gas

AS long as there have been pits at Whitehaven there has been trouble with methane. As early as 1733 Sir James Lowther presented a paper to the Royal Society describing the emission of methane encountered in the course of sinking a pit in Cumberland, and it was in an attempt to combat the dangers of this gas that Carlisle Spedding invented a device for giving light below ground. At about this time, methane from a Whitehaven pit was piped to the surface and a local doctor and amateur scientist named Brownrigg used it to heat furnaces in his laboratory. Concurrently, a proposal was put to the town authorities that the gas should be used for lighting the streets; but nothing came of the idea. There are also records of a form of methane drainage having taken place as early as 1815 at Wallsend-upon-Tyne, where the gas was piped away, though no use was made of it. Following an explosion at Haswell Colliery in Durham in 1844, Michael Faraday and Sir Charles Lyell proposed a scheme for piping methane from the goaves, but this idea was rejected as impracticable.

In mining operations a concentration of methane can be dangerous, and the method for dealing with this problem has been to increase ventilation so as to make the methane concentration as low as possible. The methane at Haig Colliery, Whitehaven, was removed via the airways at a concentration of about 1%. Modern developments in equipment and techniques have now made it possible to increase safety by keeping as much as possible of the methane entirely out of the ventilation system, the gas being removed in a concentrated form by pipeline. This is the essence of methane drainage.

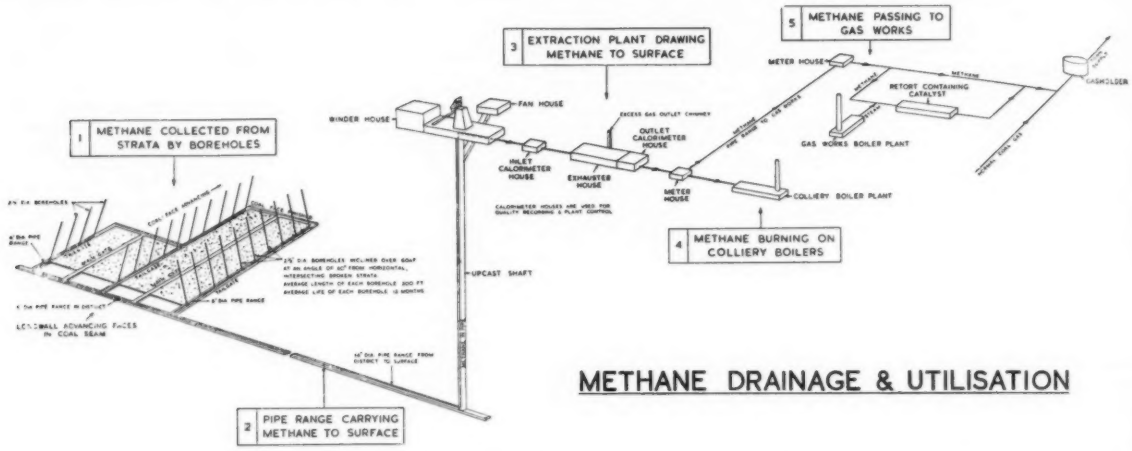
The decision to explore the possibilities of methane drainage at Haig Colliery was taken in April, 1948, and thereafter two years were spent in an extensive survey to find out where the gas was coming from and how best to tackle the problem.

It has been found that the greatest emission is obtained at a point about 100 yards back from the face in a zone where there is separation of the roof strata, thus providing a ready path for the gas. Long boreholes are put up into the roof strata at such points to collect the gas, which is then led into a collecting main.

Performance of the Methane Extraction System

Before the present scheme was commenced a pilot scheme was set up for an experimental period in order to test various techniques. A few holes were bored in 1951 and the gas extracted was led out of the pit via the main airstream. This pilot scheme gave valuable experience and information for use in developing the present programme. The first phase of the present scheme came into operation on June 18, 1952, when part of the methane was kept out of the airways and flowed to the surface via the pipeline. The movement of the gas out of the pit was brought about by its buoyancy. The extraction plant now in use for drawing the gas was brought into operation for trials on August 5, 1952, and since September 8, 1952, has been working without interruption. During the past 11 months the plant has extracted about 500 cu.ft. per min. of pure methane. The life and yield of boreholes vary considerably but one which was bored 2½ years ago has yielded over 100 mill. cu.ft. of gas—equivalent in heating value to over 4,000 tons of coal.

Investigations are now being carried out at two other Cumberland pits but they are not yet sufficiently advanced for conclusions to be reached. In particular, the quantity of methane which it is likely can be drained away has not yet been accurately assessed, though the evidence so far obtained does not indicate very large quantities. Should it be decided to embark on drainage operations, the best method of collecting the gas would still have to be evolved. Although the general principles of the method would be the same as at Haig pit, the details would be determined by conditions in the individual pits concerned. Methane drainage is still in the experimental stage and much has yet to be learned about the collection of the gas. The Haig scheme itself is regarded as only partially complete; but the information it has provided will be of great value for future operations.



METHANE DRAINAGE & UTILISATION

Since the autumn of 1952, increasing quantities of the gas have been used to heat the boilers at the colliery, thereby saving some 7,500 tons of coal. Valuable as this has been for the Coal Board, the national interest should be better served by other use of the gas. The colliery boilers can function well enough on the solid fuel (much of it low grade) for which they were originally designed. Most of the gas is still used under the boilers but, as the Northern Gas Board's plans fructify, the amount used will be reduced—or even eliminated.

Experimental Work of the Gas Board

From an early stage, close collaboration has been maintained between the coal and gas industries in order to determine how methane collected from colliery workings can best be used in the national interest. Several alternative uses have been, and are being, examined and it was decided to study one of these by making a practical test at Whitehaven of the use of the gas for town supply.

The conditions here were very suitable, as the Gas Board had already arranged to cease manufacture at its Whitehaven works (which were ill-equipped and in a bad condition of repair when taken over by the Board) and to extend the gas grid which supplies the Ennerdale area to enable Whitehaven to receive a bulk supply from it. The idle plant at the gasworks could thus be turned over to handle

(*Continued on page 589*)

L'Association Technique de l'Industrie du Gaz en France

The French Gas Association

70th Congress

Mr. J. T. Haynes, M.I.C.E., President of The Institution of Gas Engineers, writes:

THE French Gas Association holds its Annual General Meeting alternately in Paris and in the Provinces. This year the Meeting—its 70th—was held at Nice, on June 16 to 20, and coincided with the centenary of the local gas undertaking. There was a large attendance of members of the Association and their ladies, together with the Chairman (M. Le Guellec) and Deputy-Chairman (M. Combet) of Gaz de France and a number of representatives from kindred Associations, including the Immediate Past President of the International Gas Union (M. Brabant), the President of the Belgian Gas Association (General Pirot), the President of the Saar Gas and Water Association (M. Guillet) and the President and Secretary of The Institution of Gas Engineers. The foreign delegates received a very warm and cordial welcome and enjoyed throughout the meeting that generous and spontaneous hospitality that our French colleagues know so well how to provide.

The programme of the meeting was a strenuous one. After opening business, the President (M. Kec) gave a stimulating Address in which he asked "Are some of the traditional beliefs and techniques in the Gas Industry now obsolete?" Without votes of thanks or discussion of the Address, the meeting then embarked upon the discussion of exactly forty papers (representing nearly 700 printed pages), which were disposed of in five sessions; the morning sessions starting each day at 8.30 a.m. At the final session an Address was given by M. Le Guellec, Chairman of Gaz de France. Many of the papers were short and strictly limited in scope, but the subjects dealt with were very diverse. It is customary for the papers to be circulated in advance and presented without or with only a very brief introduction. The discussion includes prepared contributions, but is frequently in the form of direct question and answer. The author stands throughout, on the platform, answering questions as they arise, and at times the discussion becomes general across the hall, with the President intervening as required. The length of the discussion depends upon the interest in the paper.

Afternoon visits included the Nice Gasworks and the Radio Station at Monte Carlo. The former are in course of extension, last year's output being about 1,400 mill. cu.ft. Their construction presented many problems, notably in the matter of foundations; the soil is alluvial and deep piling was needed.

The social programme matched the technical in intensity. There were half-day and whole-day excursions for ladies only to some of the beauty spots for which the Côte d'Azur is rightly famous. There was an official reception of all participants by the Municipality of Nice and a second reception by the Government of Monaco in the gardens above the town. There was a social evening, including dancing and cabaret. But perhaps most memorable of all, for the overseas visitors, was a very special dinner party given for them by the President and Council of the Association Technique in the beautiful Eden Roc Pavilion at Cap d'Antibes.

The meeting concluded with a whole-day visit, by land and sea, to San Remo, where some 800 persons were entertained to luncheon, in the Municipal Casino, by the Italian Gas Association ("Associazione Nazionale Industrali Gas"), whose President (M. Verga) made a cordial speech of welcome.

One left the meeting with an impression of the great friendliness and hospitality of our French colleagues and of their intense interest in their work, with a heightened realization of the community of interests and problems throughout the Gas Industry in all countries, and with a firm conviction of the importance of fostering close relations with our kindred Associations overseas.

Some Abstracts by 'ASHTON'——

Introducing his abstracts, 'Ashton' points out that Nice is becoming one of the big central manufacturing stations of the region feeding a wide stretch of the Mediterranean coast including the Principality of Monaco.

He has roughly classified as follows the 40 papers presented:

Manufacture	8
Technical control	9
Purification, etc., ...	5
Distribution	9
Utilisation	9

M. Kec's Presidential Address dealt mainly with the immense problem suddenly presented by the necessity to modernise as quickly and cheaply as possible the major part of the 34,000 km. (21,000 miles) of distribution. It would be desirable if the reticulation of the future could be as accessible as possible, without joints, supple, giving rise to no dust, carrying gas clean and dry, of any desired composition and calorific value, under distribution pressures of the order of 500 mm. (say, 20 in.) or even more, and feeding consumers through reducing governors either at the service to each building or to each individual meter—governors which would be standardised, mass-produced, mechanically sound and capable of precise adjustment. He suggested that one or other of the new plastic materials might possess the necessary properties for the new reticulations.

M. Kec chose for the title of his Presidential Address the question "Are not some of the traditional beliefs and techniques in the Gas Industry now obsolete?" He went over some of the familiar problems arising out of the facts that coal is being joined by a number of other raw materials, and new techniques are put forward for the manufacture of gas. The cheapest gaseous calorie does not always correspond to a calorific value in the region of 4,200 and 4,500 (440 and 470 B.Th.U./cu.ft.). It may be necessary to vary the nature of gases distributed from one month to another, but the constant service to which the client is entitled will only be obtained by the distribution of gases of calorific value "variable in time and having densities proportional to their calorific value." There was, he said, no optimum calorific value of general application. Mixtures of gas cannot be arbitrary. Calorific value ceases to be a sufficient criterion of quality.

In the following pages of today's issue the papers on Manufacture are dealt with.

"C.G.C.F." Gilly Plant at Cherbourg

M. Roland Nory (Inspector-General of the Western Division) and M. Yves Mazet (Engineer at Cherbourg) described the horizontal chambers with C.G.C.F. Gilly "Underjet" heating installed at Cherbourg.

The general condition of the gas-making plant at Cherbourg after the war years was such that, in particular, it was necessary to undertake the complete renewal of a battery of 7 settings each of 8 horizontal retorts 6 m. long. The growing demand called for an increase of capacity, and local conditions required this to be effected on the same ground space with progressive substitution of new retorts for those existing. After competition among the leading constructors the solution offered by the Cie. Gle. de Construction de Fours was accepted. The system is that designed by their Chief Engineer, M. Gilly.

The setting, which replaces 2 settings of 8 retorts, consists of 10 horizontal chambers in silica, in 2 tiers, each of 1-5 tonnes capacity. Heating is by cold producer gas from independent generators. The special feature of the design is that of the recuperation. This consists in, first, a refractory portion heating the secondary air, and secondly, a metallic portion heating both producer gas and secondary air. The increase of production capacity thus realised, in comparison with the 2 settings of retorts occupying the same space, amounts to 80%.

The general arrangement of the new plant at Cherbourg is shown in Fig. 1 of the paper, reproduced on facing page. Figs. 2 and 3 show the recuperative system of the Gilly patents in detail. The heating of the air is effected in two stages—(a) by circulation round the waste gas flue 19 in a cellular jacket 7, and (b) leaving the air jacket, the heated air is led by insulated collectors under the floor of the setting to distribution boxes 8, forming the lower portion of the refractory recuperators. These are formed in the division walls between the combustion chambers. The heated air follows 3 circuits to enter the chambers at 3 points in the height of the combustion chambers, by way of circuit 9 at point 6 at the entry of the producer gas, circuit 10 to a point somewhat higher and circuit 11 for tertiary air to point 12, each circuit being separately controlled at the base of the division wall.

Combustion should be practically complete at the top of the combustion chambers at the point 13, and the waste gases descend by way of the refractory tubes 14 in the division wall. These tubes constitute the centre of the recuperator, the air circuits being arranged round them. A conical damper 15 controls the draught on each element. The gases enter the collecting flue 17 by way of the passages 16. Steam is admitted to the carbonising chambers at points 20.

The producer is of the classic rotary grate type and is so proportioned as to serve for augmented gas production as well as for heating the carbonising chambers. It serves to dilute the coal gas to 4,200 cal. (440 B.Th.U.) and it

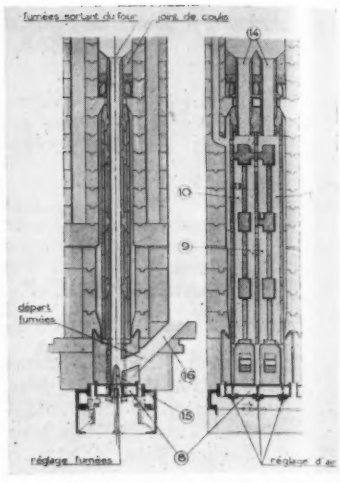


Fig. 3

can be used to regulate the calorific value of peak load gas based on propane. From the generator the producer gas is washed in a scrubber and then sent direct to the settings or to the mixing apparatus for the peak load gas, where automatic control of calorific value is provided for. The producer gas is led to the settings in pipe 1 with a pressure of about 40 to 50 mm. (say, 2 in. W.G.), through valves and branch pipes 2 laid in the waste gas flues below the setting to the annular heater 3, also in the hot waste gas circuit. From the heater the hot gas passes to the flue 4 from which it rises to the combustion chambers by the passages 5, each separately controlled.

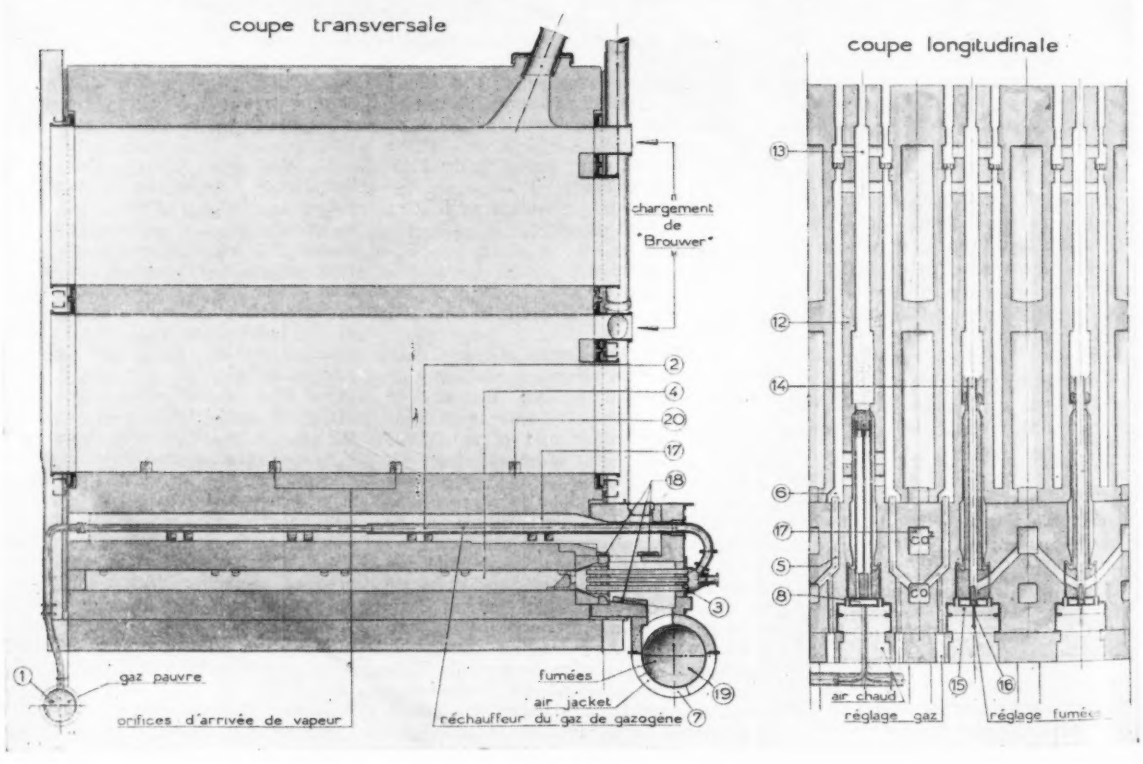


Fig. 2

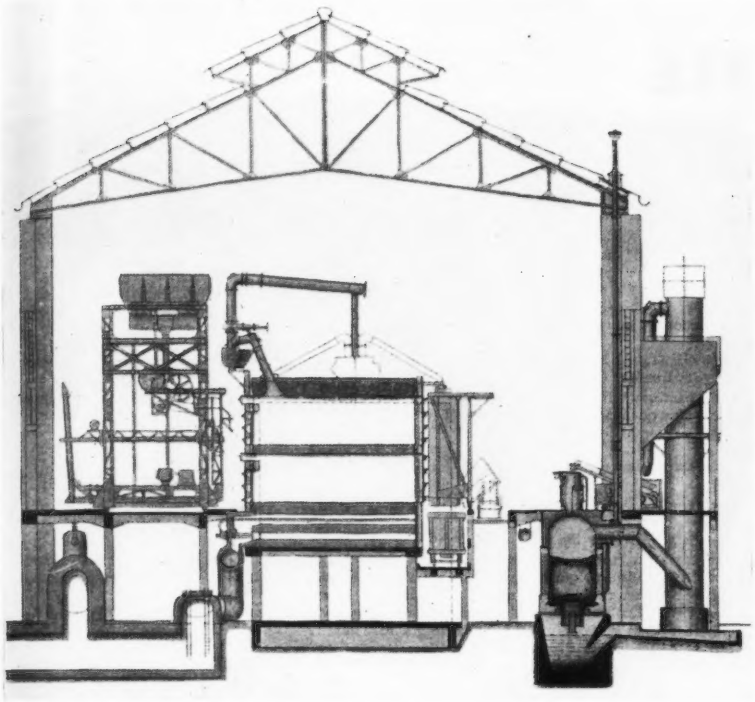


Fig 1.

One of the two existing De Brouwer charging and discharging machines was modified as indicated in Fig. 1 to deal with the new problem. Coke is pushed out into a skip in which it is quenched before transfer to the existing system of handling and storing.

Details of test results are given in the paper. The guarantees of the constructors were realised, particularly that of the fuel consumption, which was 13% of pure carbon by weight of coal carbonised as supplied with 3% moisture. Results are so far satisfactory. It is intended to proceed with the reconstruction of the whole battery, but possibly with single chambers of double the capacity and a complete modification of the coal handling system.

The paper contains thermal balance sheets and details of several items of control, of some though minor interest.

Safety First on Coke Ovens

Safety arrangements in the operation of coke oven batteries are described by M. R. Groffier, Chief Engineer, and M. R. Hutellier, Engineer to the Paris Gas Group No. 1. From the commencement of operation of the new coke ovens at Cornillon, the engineers have been struck by the multiplicity of causes of accident which can occur and of which the consequences may be extremely grave. Some of these accidents are caused by the inattention of personnel, others are mechanical, some endanger the safety of personnel. They had thought that, in view of the importance and frequency of these accidents, those who had been operating coke ovens for many years would have devised means of obviation, and that it would only be necessary to adapt these devices to local conditions. Information they had received, however, indicated that no such means of security existed; consequently they had to study the problems for themselves.

The measures they devised and describe concern, first, the obviation of accidents and stoppages of the operations of charging and discharging; then the assurance of correct and complete inversions of flow in regeneration and finally the avoidance of accidents which might cause injury to personnel from machines in movement.

The installation is briefly described. In a first scheme the pusher and the coke shoot are connected by electric circuits in such a manner that the circuit is not closed until both pieces of apparatus are in the correct position; similarly for charging, which cannot operate until the doors are in position and fastened. Another scheme covers the mechanism of change of flow of gases and air in regeneration. Finally, one for the safety of workmen at the opening of the passage between two batteries, so that men may not be trapped between machines and bench. A light and sound system of signalling gives the alarm when the coke buggy is about to move into the danger zone.

Other papers which might be classified under this heading were on the 'Choice of Means of Transport and Storage of Propane' by M.M. P. Albrieux and G. Péage, Chief Engineer and Engineer respectively of the Department of Distribution of Gaz de France, and on 'Subterranean Storage of Natural Gas in the Chicago District' by M. P. L. Schereschewsky, Mines Chief Engineer.

Experiments in Coal Blending

In two communications, M. Roger Loison, Chief Engineer to 'Cerchar,' and collaborators described the new apparatus installed at the experimental station at Marienau and the programme of research into the possibilities of blending different Lorraine and Sarre coals with additions of imported coals and semi-cokes to obtain metallurgical cokes for steel production. There have been carried out 64 tests in ovens with 44 different mixtures.

The tests fall into two classes—one for the production of a steel-making coke suitable for blast furnaces, the other for that of an industrial coke suitable for central heating boilers. Attention is drawn to the importance of the conditions of preparation and of charging the mixture, particularly regarding the density of the charge and the grading of its constituents.

Re-forming Natural Gas in the S.W.

M. José Lagoubie (Director-General, Régie Municipale du Gaz et de l'Electricité) described the technique of dealing with the supply of natural gas in the South West. [In the *Journal* for July 23, 1952, p. 200, we made a reference to the Bordeaux plant.] The present paper describes the apparatus in greater detail.

The use of coal was discontinued in February, 1952. The natural gas from the S.W. region has a % composition of 92 CH_4, 3 N_2, 4 C_2H_6, 1 C_3H_8 and over, with a calorific value of 9,600 calories gross (1,000 B.Th.U./cu.ft.). It is 'reformed' by the steam-catalytic process of the Hercules Powder Co. and 'converted' to 6.6 CO, 74.9 H_2, 3.7 CH_4, plus inerts. A total of 0.552 cub.m. of natural gas is sufficient to produce 1 cub.m. of town gas. The pressure of the natural gas is sufficient to drive it through the apparatus and to high-pressure distribution. The town gas falls within the zone of interchangeability with coal gas as determined on the Delbourg diagram. The natural gas being free from sulphur, no purification is required, but it is necessary to supply an odour. After several trials the odorisation finally adopted was 99.4% benzole, 0.5% pentalarm and 0.1% cresol, at the rate of about 4 g. per cub.m. The plant is self-supporting in steam.

The outlook for the future is that according to the most optimistic forecasts the source of natural gas will be exhausted at the present rate of use within 15 years. There are serious indications, not yet confirmed, that new sources may be discovered within this time. The 'Hercules Powder' plant will serve for the re-forming of propane. Other possibilities are the use of fuel oil and especially refinery gases from an installation in the proximity the future of which appears to be 'solidly assured.'

(Continued on page 589.)

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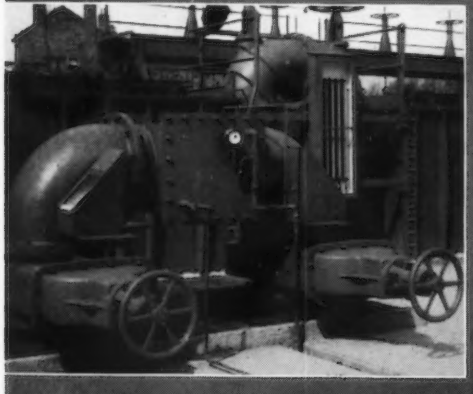
ILLUSTRATED BELOW
Enlarged view showing
Preheater and instruments



ILLUSTRATED ABOVE

Four cast iron Purifiers 35 ft. square x 6 ft. deep in two lines of two, at ground level, with Preheater and two sets of lifting apparatus, complete with foundations and retaining wall, for the Scottish Gas Board, Motherwell

Enquiries are invited for cast iron and mild steel Boxes, and Tower Purifiers. An announcement will appear shortly relating to Gastechnik Purifiers, meanwhile, please send us your enquiries for Plants on this system for water gas and producer gas.

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B.W.

"O.C.C.R." Producer using Heavy Oil

M. Louis Cadet (Engineer, Western Group) dealt with the 'O.C.C.R.' producer, which has been working since April, 1952, using heavy oil and supplying fuel gas to a setting of Picard intermittent verticals.

The fuel oil is fed, and air (which may be pre-heated) is injected tangentially, into a refractory-lined cylindrical chamber where a temperature of the order of 1,600°C. is maintained, the gaseous mass being in rapid rotation. The reactions produced—partial combustion, cracking, gasification—give rise to a gas with a temperature at exit of the order of 1,240°C. and calorific value gross of about 1,100 cal./cub.m. (115 B.Th.U./cu.ft.). Part of the carbon is not gasified and is found in the gas in the form of finely dispersed free carbon bringing the C.V. of the mixture to about 1,800 cal./cub.m. (190 B.Th.U./cu.ft.). A short connecting flue conducts the gas to the settings where combustion is completed with a slight excess of secondary air. A small quantity of residual coke accumulates in the base of the producer whence it is evacuated periodically.

Initially intended to gasify fuel oil, the apparatus is found to operate equally well with dehydrated crude tars and with creosote oil.

The paper contains details of tests. Thermal efficiencies are of the order of 95 to 98%. Operation is easy and regular, requiring little attention. Taking into account capital and maintenance charges on the producer and its equipment, a comparison at the Andrésy Works, where it is installed, shows that under the prevailing conditions a saving of 20% is effected over the use of coke. The quantity of sensible heat in the gas and its content of free carbon limits at present the application of this producer to a lay-out where it can be installed practically integral with the setting and to the use of hot, uncleaned gas.

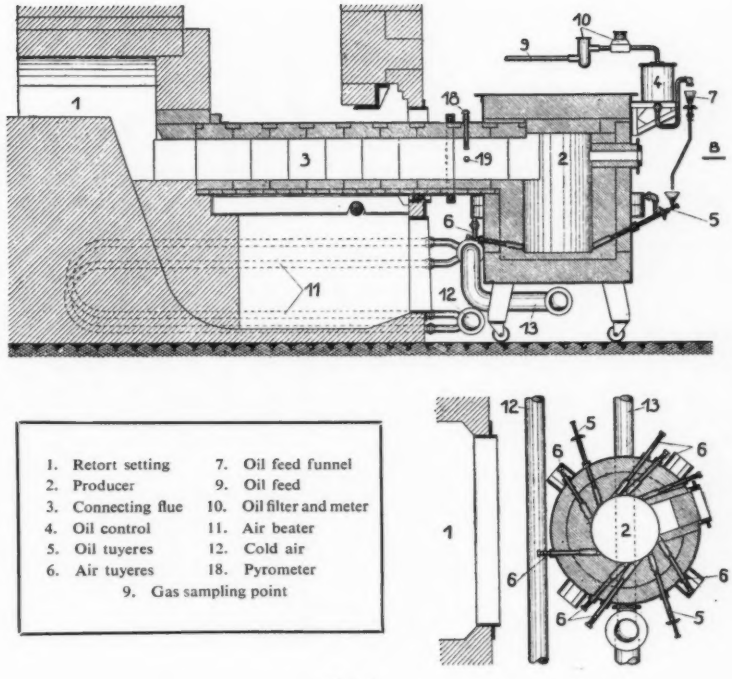

Fig. 4

Details and arrangement of the essentials of the apparatus are shown in Fig. 4. The interior dimensions of the gasification chamber are 0.565 m. dia. by 1.030 m. high. The steel covering is 1.220 m. external dia. by 1.500 m. high.

(To be continued.)

Firedamp as Town Gas—*Continued from page 584.*

methane, while the flexibility of the grid would permit fluctuations in the supply of the new gas to be compensated without difficulty. Accordingly, a pipe was laid between the Haig Colliery and the Whitehaven gasworks and methane commenced to be delivered through it a few weeks ago.

Although methane has a higher heating value than the normal town supply, its flame speed is low, so that, if it were supplied to gas appliances with burners designed and adjusted for ordinary town gas, it would not give satisfactory results. It was essential, therefore, to modify the gas so that it could be supplied alone, or be mixed in any proportions with gas from normal sources, without any change in the behaviour of the flames or in the performance of the many hundreds of cookers and other appliances used by gas consumers.

The method which has been adopted to modify the gas is one known as catalytic re-forming. A part of the gas is mixed with steam and passed over a nickel catalyst maintained at red heat. This process converts the methane to a mixture of hydrogen and carbon monoxide —both normal constituents of town gas—which, when blended with unaltered methane, produces a final gas identical in behaviour and in heating value with the usual supply.

To start the scheme some of the existing gas retorts have been converted to serve as catalytic chambers and have proved quite successful in effecting the desired re-forming of the methane. It is intended to continue to use the retorts in this manner until a furnace has been designed and built specially for the purpose, when the same results will be achieved at a higher efficiency and with the use of less fuel to maintain the catalyst at the required temperature.

In the meantime, valuable experience is being accumulated and it has been established that the gas supply system can be fed with normal gas, or with the re-formed mixture, or with any blend of the two, with entirely satisfactory service to consumers. Having established this, wide fluctuations in the availability of methane (the extraction of which has to be governed by colliery conditions rather than by the requirements of the Gas Board) can be accommodated so that all the methane made available can be put to use by the Gas Board.

As the work continues, information will be accumulated on the degree of regularity of methane supply which may be expected and on the most efficient methods of its treatment for town use. The possibility of accepting all available methane, and extending its use by means of the gas grid to supply districts beyond Whitehaven, will be examined. At the moment, the work should be regarded as experimental—although on a practical scale. Preliminary results are encouraging and the work will proceed. In all the work there has been the closest collaboration between the coal and gas industries at all levels in an endeavour to put the methane to the best possible use.

The diagram on p. 584 shows how methane is drained from the pit and passed through the Gas Board's retorts to the town main.

The National Coal Board's seventh Summer School opens at Oxford on September 5 and will continue until the following Friday. Half the working week will be taken up by discussions by groups of students of topics germane to their particular jobs. These 'syndicate' talks will cover such diverse subjects as the development of cost consciousness, efficiency on the surface, the employment of juveniles, and the deployment of men.

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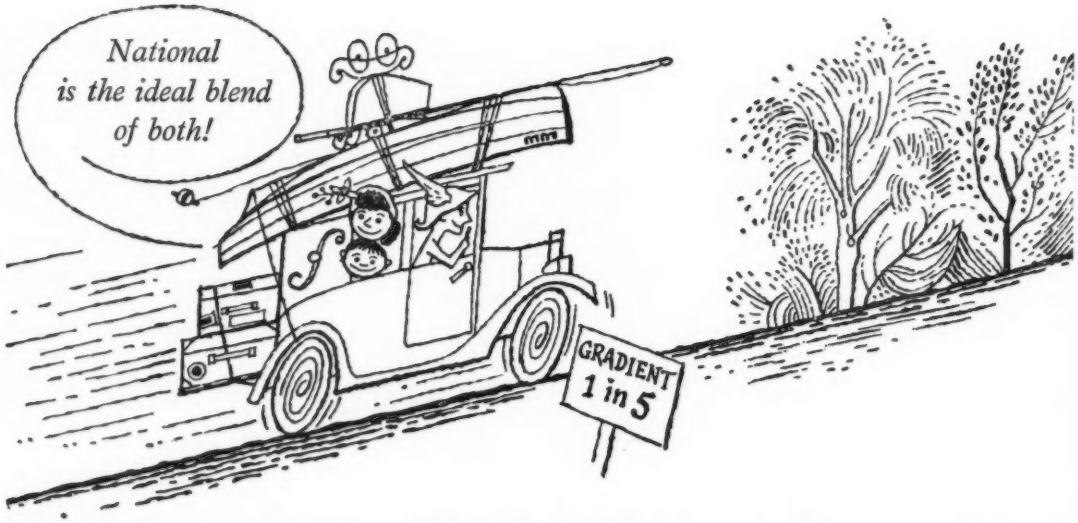

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Oils and Chemicals from Coal

The Fischer-Tropsch Process

THE Fuel Research Station has carried out research and development work on the Fischer Tropsch process since 1935. As a result of its own work and of its contact with research workers abroad the Station has available much valuable information on the process and its application in the chemical industry.

In 1925, two German chemists, Franz Fischer and Hans Tropsch, discovered that carbon monoxide and hydrogen, the main constituents of water-gas derived from coke or coal, would react in the presence of nickel, cobalt, or iron catalysts at atmospheric pressure and a temperature of about 200°C. to form a mixture of hydrocarbons approximately equivalent to a crude petroleum oil. This reaction is the basis of what is known as the Fischer-Tropsch synthesis which provides a means of producing petrol, diesel and jet fuels, waxes, and a wide range of chemical products from coal.

In its original form, the process was used in nine German plants during the period 1939-45 and produced annually about 500,000 tons of liquefied gas, petrol, high-grade Diesel oil, and other products.

Interest in this process is world-wide and is not confined to countries without indigenous petroleum. In the U.S.A., for example, both Government and industry have spent large sums on research and development work on the process, culminating in the construction by industry of a commercial plant at Brownsville, Texas, to produce 300,000 tons per annum of high-grade petrol from natural gas, and the erection by the U.S. Bureau of Mines of a 300 tons/year 'demonstration' plant at Louisiana, Missouri, based on coal as raw material.

The Major Cost

The major cost in the operation of the Fischer-Tropsch process is that of making the synthesis gas, the required mixture of carbon monoxide and hydrogen, which, in turn, is largely dependent on the cost of coal or other basic raw material. At the present price of coal relative to petroleum oil, the operation of the Fischer-Tropsch process to produce liquid fuels as main products is not commercially economic in this country or in the U.S.A. The work of the Bureau of Mines in America and of the Fuel Research Station in the United Kingdom, is to a large extent, therefore, concerned with the possibility of future shortages of natural petroleum oil, either local or world-wide. No commercial Fischer-Tropsch plant has ever been erected in this country and, so far as is known, no plans exist for building one.

Where very cheap coal is available production of synthetic oil can compete with imported petroleum oil and at the present time a Fischer-Tropsch plant to produce about 200,000 tons a year of petrol, Diesel oil, and waxes from low-grade coal is in course of construction at Coalbrook, Orange Free State, in the Union of South Africa. Serious consideration has been given to the erection of a similar plant in Southern Rhodesia where similar conditions prevail.

Since the process was first industrialised in Germany in 1936, it has undergone many improvements and modifications. Active and durable iron catalysts have been developed which are cheaper than the cobalt catalysts used in the original German plants and confer greater flexibility on the process both with respect to the nature of the gaseous raw material and process conditions which can be employed and to the nature of the products which can be obtained. The ratio of carbon monoxide to hydrogen in the gas mixture can be varied over a wide range and even a mixture of carbon monoxide and steam can be used as feed material. Temperatures within the range 200°C. to 350°C. and pressures from atmosphere to 50 atm. can be employed. The reaction products can consist almost entirely of gaseous and low-boiling olefins, which makes possible the production of 80 octane motor fuel as the main product, or to the extent of 60% or so of solid waxes. The products can consist almost entirely of hydrocarbons or predominantly of alcohols and other oxygen-containing compounds. The primary products are suitable for conversion into lubricating oils, synthetic fatty acids, and detergents by further chemical processing.

Considerable advances have been made on the chemical engineering side of the process. The synthesis reaction is strongly exothermic (over 7,000 B.Th.U. released per lb. of product made) and the production of the required products is highly dependent on efficient control of catalyst temperature by removal of the heat of reaction. In the original German plants this was achieved by using a fixed bed of catalyst granules packed into water-cooled tubes or into a vessel equipped with finned tubes carrying cooling water. In either case the catalyst temperature was controlled by regulating the steam pressure in the cooling system.

The fixed bed system has been improved since the war by the Ruhrchemie A.G. (the licensors of the original process) and the space-time yield increased to about five times that achieved in the original reactors. The first stage of the South African plant is to be equipped with reactors of this improved fixed bed type.

By utilising the 'fluidised-solids' technique for the synthesis very much higher rates of heat transfer from the powdered catalyst to the cooling water can be obtained. In pilot plant operations with this technique, space-time yields 20 times greater than those obtained in the original fixed-bed plants have been achieved. The fluidised-catalyst system suffers from the disadvantage of requiring a rather narrow range of conditions for successful operation and is, in any case, restricted to the production of gaseous and low-boiling hydrocarbons (petrol) and low-molecular weight oxygenated compounds. The second stage of the South African plant will employ a special type of fluidised catalyst system devised by the M. W. Kellog Company.

Various liquid-phase systems have been tried out in the Fischer-Tropsch process. In these, the catalyst is in direct contact with a non-volatile liquid cooling medium and although the presence of this medium retards the rate of the synthesis reaction, very efficient cooling of individual catalyst particles is obtained and the production of undesired products such as methane, is minimised. In the Fuel Research Station's view, the most promising of these techniques is the slurry process in which finely-powdered catalyst is suspended in molten wax and the synthesis gas is passed up through the suspension. Volatile reaction products pass out of the reaction with the effluent gas stream; non-volatile waxes and heavy oil remain in the slurry whence they are removed through a filter to maintain a constant level of liquid in the reactor.

Both the liquid-phase slurry and the fluidised-catalyst systems possess the advantage of permitting continuous replacement of catalyst in order to maintain a constant level of catalyst activity and hence, product quality. In the fixed-bed process the reaction temperature is normally increased with time to maintain the desired level of conversion until a certain stage of catalyst deterioration has been reached, when the contents of the reactor must be discharged and replaced by fresh catalyst.

On Show at Olympia

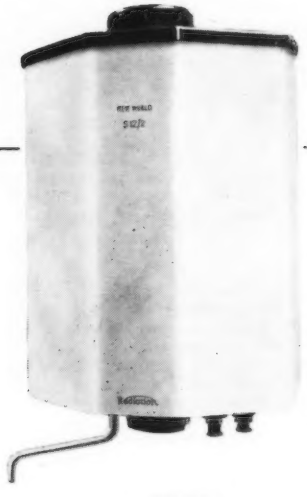
The equipment at present available at the Fuel Research Station for this work includes a number of laboratory-scale units for catalyst development and testing and for studying the effect of process conditions on catalyst performance and product quality. For the study and development of process techniques two fluidised catalyst units and four liquid-phase units are available. To obtain more reliable chemical engineering data for various reaction systems and to facilitate the design of a suitable reactor for commercial-scale operation a pilot plant to give 50-60 gal. of products per day has been built. This plant has been equipped with two reaction vessels, one designed for fluidised catalyst and the other for the slurry process. One of the liquid-phase units referred to will be in operation on the stand of the Department at the Engineering, Marine and Welding Exhibition.

At the end of the war in 1945 the Director and members of the staff of the Fuel Research Station played a leading part in collecting and collating the vast amount of information available in Germany on the Fischer-Tropsch process and the fact that the information thus made available to allied readers is so complete and accurate is in no small measure due to the previous knowledge of the process which the investigators possessed. Since the war close personal contact has been maintained between the staff working on the process at Greenwich and those working in the field in the U.S.A. and Germany.

Although the production of liquid fuel as the main or sole product is not a commercial proposition in this country, the possibilities of combining oil synthesis with other processes such as town gas manufacture, electricity generation, pig-iron production or calcium carbide manufacture merit examination, and the production of high-melting point waxes or oxygenated products by the Fischer-Tropsch process might well prove to be economic. The possibility of large synthetic oil plants being built in areas where cheap coal exists and imported oil is costly could provide opportunities for British plant constructors and engineering constructors.

Take the MAINTENANCE

The CIRCULYN C.60



The NEWLYN S.12/2

The CIRCULYN C.28

The CIRCULYN C.125

North Western Extensions and Reconstruction

Progress in the Groups

STEADY recovery in gas sales during the June quarter in the area of the North Western Gas Board was accompanied by consistent progress in the extensions and reconstruction work throughout the operating groups. The *Bulletin*, from which we quoted in our last issue the quarter's statistics for gas and coke sales, gives the following information concerning progress towards improved manufacturing and distributing plant.

The second half of the new 4½ mill. cu.ft. per day continuous vertical retort production plant at the Bradford Road works, Manchester, went into operation during the quarter. Construction of this plant was begun in January, 1949, and the first half was completed during the September quarter of 1952. Work is still in progress on the new 6 mill. cu.ft. horizontal retort plant and on the two new carburetted water gas plants.

It is anticipated that the horizontal retorts will be ready for operation by the autumn of 1954. The capacity of the Bradford Road works will then be some 28 mill. cu.ft. per day.

Reconstruction and extension of production plant at the Salford works reached a further stage during the quarter when the 1 mill. cu.ft. per day chamber oven plant, on which work was begun about 18 months ago, went into production. Work is still in progress on the 2 mill. cu.ft. per day continuous vertical retort installation, and it is anticipated that this will be completed by January, 1954. The capacity of the Salford works will then have been raised from 8.5 mill. cu.ft. at vesting date to about 14 mill. cu.ft.

Salford Purifiers

During the quarter the Board authorised the installation of new oxide purification plant at the Salford works, with a capacity of 7 mill. cu.ft. per day, at a cost of £169,000. The existing plant was installed between 1878 and 1899 and is now structurally unsound.

The new 4½ mill. cu.ft. carburetted water gas plant at the Linacre works of the Liverpool Group went into operation in February. This plant is required to maintain supplies until the completion of the new 14 mill. cu.ft. per day carbonising plant at the Garston works in the same group. Subsequently, it will be used to cover load fluctuations in the area of the Liverpool grid.

With the addition of the new water gas plant the capacity of the Linacre works has been raised, since 1949, from 20.3 mill. cu.ft. to approximately 25 mill. cu.ft. per day.

In accordance with the scheme of interlinkage between the Manchester Group and Tyldesley, production of gas at Tyldesley ceased during the quarter, and consumers in the district are now supplied by the Manchester grid. The Leigh district is also partly supplied from the Manchester grid by a connection via Salford and Radcliffe. Complete supply from the Manchester area will be provided when the grid main from Partington over the Ship Canal via Culcheth is completed. The inclusion of Tyldesley in the Manchester grid has will enable the entire coke output of the Brierfield works to be efficiently graded and will result in a corresponding improvement in the service offered to coke consumers in the Nelson area. It is anticipated that construction will be completed during the spring of 1954.

Construction of a new coke screening plant at the Cloughfold (Rossendale) works of the Bury-Rossendale Group was begun during the quarter. The estimated cost of this plant is £45,000 and it is expected that work will be completed in about nine months.

The long distance main connecting the Blackpool undertaking with the Eastham (St. Annes) works was completed during the quarter. This link will, in the first instance, provide a partial bulk supply to St. Annes. The Eastham works can now be operated at 100% base-load capacity, while fluctuations in demand can be covered entirely by water gas supplies from the Marton works of the Blackpool undertaking.

As a result of the completion of this link it has been possible to discontinue temporarily the use of the gasholder at Eastham, which has for some time been in a dangerous condition but could not be withdrawn from service owing to lack of alternative storage capacity. Thus the completion of the long distance supply system has made it possible to avoid expenditure of some £50,000 on the construction of a new holder, which would otherwise have been necessary.

Work has begun on the construction of a new 500,000 cu.ft. capacity gasholder in an existing tank at the Fleetwood works. The replacement of storage plant at these works has been necessary for some time, but owing to the increase in demand for gas in the area it was not possible to discontinue the use of existing plant. By using the new long distance link with Blackpool, supplies can now be maintained while the work is in progress.

Mid-Cheshire Linkage

During the quarter production of gas was suspended at the Winsford and Northwick works of the Mid-Cheshire Group. This was in accordance with the Board's plan for interlinkage in the Mid-Cheshire area, based on bulk supply from the Partington works in the Manchester Group.

The Mid-Cheshire grid is now complete up to Sandbach. Future plans comprise a further extension to include Nantwich and Crewe.

Work has begun on the first stage of the major extension of the Lostock Hall works of the Preston Group. The first stage provides for a 4 mill. cu.ft. per day carbonising plant. Ultimately, it

The Board has authorised the laying of an 18 in. main between the Warrington works of the South Lancashire Group and the East Lancashire Road. This will afford interlinkage between Warrington, Newton-le-Willows and St. Helens. It will also provide a connection of limited capacity through existing mains between Warrington and Wigan. The intention is to continue the main from the East Lancashire Road direct into Wigan, in order to give complete interlinkage.

The length of the project at present authorised is some 5½ miles, and the cost £91,000. It is anticipated that work will be completed in November of this year.

Work on the foundations of a new 1.1 mill. cu.ft. carburetted water gas plant at the Chester works was begun during the quarter. The cost of this plant will be some £45,000, and its purpose is to enable these works to meet the very rapid rise in gas demand in both Chester and Ellesmere Port. Reconstruction of the distributing system in the Chester area, which has been a major factor in stimulating demand, was continued during the quarter.

New gas supplies connected in the Board's area during the June quarter were: New council housing, 6,396; private development housing, 945; new supplies into existing houses, 909; new public lamps, 53; total, 8,303.

Conference on Welded Structures

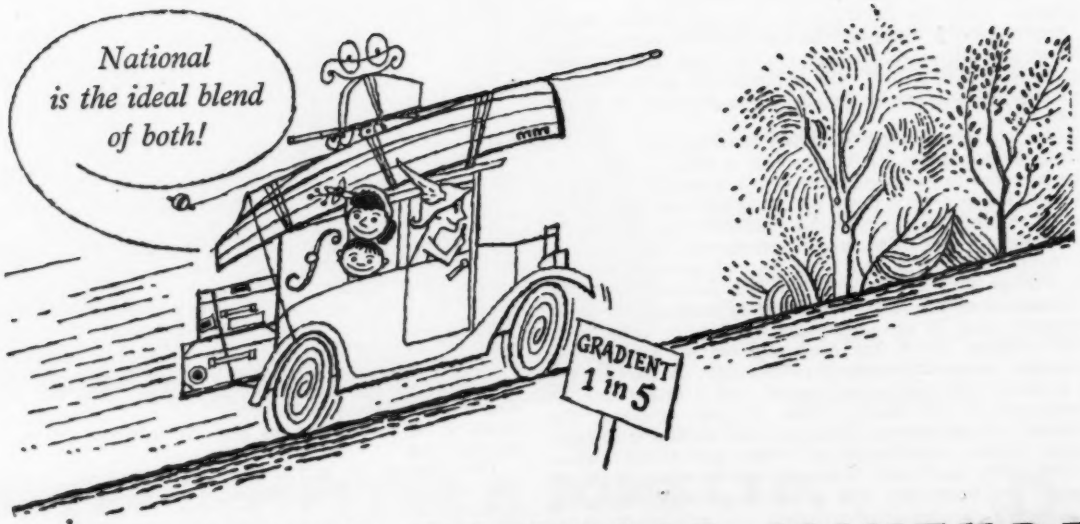
A CONFERENCE to review present knowledge and outstanding problems in the design, fabrication and erection of welded steel structures is to be held at the Institution of Civil Engineers from November 23 to 27 inclusive. The organisation is being undertaken by a joint committee appointed by the Ministry of Works, the Institution of Civil Engineers and the Institution of Structural Engineers, with the support of the Admiralty, War Office, Ministry of Supply, Ministry of Transport, and Department of Scientific and Industrial Research.

The conference is open to all interested in the subject, who register as members. Applications for membership should be made to the Joint Honorary Secretaries, Conference on Welded Structures, Institution of Civil Engineers, Great George Street, London, S.W.1, from whom application forms can be obtained.

Eleven topics have been chosen for discussion. The procedure at the conference will be to give the author of the paper a short time to introduce his paper, leaving the rest of the session free for general discussion. The author will be given an opportunity, at the end of the discussion, to reply briefly to the points raised.

The papers will include one by M. Nicolas MUMECLE, on 'Standing Oil

Benzole makes good petrol better!



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Interest in this process is world-wide and is not confined to countries without indigenous petroleum. In the U.S.A., for example, both Government and industry have spent large sums on research and development work on the process, culminating in the construction by industry of a commercial plant at Brownsville, Texas, to produce 300,000 tons per annum of high-grade petrol from natural gas, and the erection by the U.S. Bureau of Mines of a 300 tons/year 'demonstration' plant at Louisiana, Missouri, based on coal as raw material.

The Major Cost

The major cost in the operation of the Fischer-Tropsch process is that of making the synthesis gas, the required mixture of carbon monoxide and hydrogen, which, in turn, is largely dependent on the cost of coal or other basic raw material. At the present price of coal relative to petroleum oil, the operation of the Fischer-Tropsch process to produce liquid fuels as main products is not commercially economic in this country or in the U.S.A. The work of the Bureau of Mines in America and of the Fuel Research Station in the United Kingdom, is to a large extent, therefore, concerned with the possibility of future shortages of natural petroleum oil, either local or world-wide. No commercial Fischer-Tropsch plant has ever been erected in this country and, so far as is known, no plans exist for building one.

Where very cheap coal is available production of synthetic oil can compete with imported petroleum oil and at the present time a Fischer-Tropsch plant to produce about 200,000 tons a year of petrol, Diesel oil, and waxes from low-grade coal is in course of construction at Coalbrook, Orange Free State, in the Union of South Africa. Serious consideration has been given to the erection of a similar plant in Southern Rhodesia where similar conditions prevail.

Since the process was first industrialised in Germany in 1936, it has undergone many improvements and modifications. Active and durable iron catalysts have been developed which are cheaper than the cobalt catalysts used in the original German plants and confer greater flexibility on the process both with respect to the nature of the gaseous raw material and process conditions which can be employed and to the nature of the products which can be obtained. The ratio of carbon monoxide to hydrogen in the gas mixture can be varied over a wide range and even a mixture of carbon monoxide and steam can be used as feed material. Temperatures within the range 200°C. to 350°C. and pressures from atmosphere to 50 atm. can be employed. The reaction products can consist almost entirely of gaseous and low-boiling olefins, which makes possible the production of 80 octane motor fuel as the main product, or to the extent of 60% or so of solid waxes. The products can consist almost entirely of hydrocarbons or predominantly of alcohols and other oxygen-containing compounds. The primary products are suitable for conversion into lubricating oils, synthetic fatty acids, and detergents by further chemical processing.

Considerable advances have been made on the chemical engineering side of the process. The synthesis reaction is strongly exothermic (over 7,000 B.Th.U. released per lb. of product made) and the production of the required products is highly dependent on efficient control of catalyst temperature by removal of the heat of reaction. In the original German plants this was achieved by using a fixed bed of catalyst granules packed into water-cooled tubes or into a vessel equipped with finned tubes carrying cooling water. In either case the catalyst temperature was controlled by regulating the steam pressure in the cooling system.

The fixed bed system has been improved since the war by the Ruhrchemie A.G. (the licensors of the original process) and the space-time yield increased to about five times that achieved in the original reactors. The first stage of the South African plant is to be equipped with reactors of this improved fixed bed type.

By utilising the 'fluidised-solids' technique for the synthesis very much higher rates of heat transfer from the powdered catalyst to the cooling water can be obtained. In pilot plant operations with this technique, space-time yields 20 times greater than those obtained in the original fixed-bed plants have been achieved. The fluidised-catalyst system suffers from the disadvantage of requiring a rather narrow range of conditions for successful operation and is, in any case, restricted to the production of gaseous and low-boiling hydrocarbons (petrol) and low-molecular weight oxygenated compounds. The second stage of the South African plant will employ a special type of fluidised catalyst system devised by the M. W. Kellog Company.

Various liquid-phase systems have been tried out in the Fischer-Tropsch process. In these, the catalyst is in direct contact with a non-volatile liquid cooling medium and although the presence of this medium retards the rate of the synthesis reaction, very efficient cooling of individual catalyst particles is obtained and the production of undesired products such as methane, is minimised. In the Fuel Research Station's view, the most promising of these techniques is the slurry process in which finely-powdered catalyst is suspended in molten wax and the synthesis gas is passed up through the suspension. Volatile reaction products pass out of the reaction with the effluent gas stream; non-volatile waxes and heavy oil remain in the slurry whence they are removed through a filter to maintain a constant level of liquid in the reactor.

Both the liquid-phase slurry and the fluidised-catalyst systems possess the advantage of permitting continuous replacement of catalyst in order to maintain a constant level of catalyst activity and hence, product quality. In the fixed-bed process the reaction temperature is normally increased with time to maintain the desired level of conversion until a certain stage of catalyst deterioration has been reached, when the contents of the reactor must be discharged and replaced by fresh catalyst.

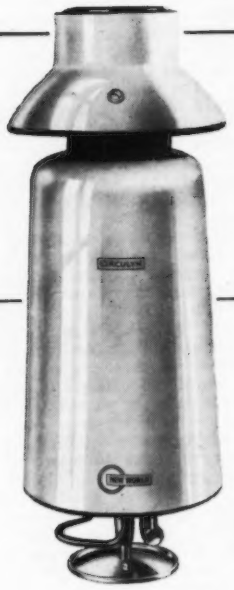
On Show at Olympia

The equipment at present available at the Fuel Research Station for this work includes a number of laboratory-scale units for catalyst development and testing and for studying the effect of process conditions on catalyst performance and product quality. For the study and development of process techniques two fluidised catalyst units and four liquid-phase units are available. To obtain more reliable chemical engineering data for various reaction systems and to facilitate the design of a suitable reactor for commercial-scale operation a pilot plant to give 50-60 gal. of products per day has been built. This plant has been equipped with two reaction vessels, one designed for fluidised catalyst and the other for the slurry process. One of the liquid-phase units referred to will be in operation on the stand of the Department at the Engineering, Marine and Welding Exhibition.

At the end of the war in 1945 the Director and members of the staff of the Fuel Research Station played a leading part in collecting and collating the vast amount of information available in Germany on the Fischer-Tropsch process and the fact that the information thus made available to allied readers is so complete and accurate is in no small measure due to the previous knowledge of the process which the investigators possessed. Since the war close personal contact has been maintained between the staff working on the process at Greenwich and those working in the field in the U.S.A. and Germany.

Although the production of liquid fuel as the main or sole product is not a commercial proposition in this country, the possibilities of combining oil synthesis with other processes such as town gas manufacture, electricity generation, pig-iron production or calcium carbide manufacture merit examination, and the production of high-melting point waxes or oxygenated products by the Fischer-Tropsch process might well prove to be economic. The possibility of large synthetic oil plants being built in areas where cheap coal exists and imported oil is costly could provide opportunities for British plant constructors and engineering constructors.

Take the MAINTENANCE



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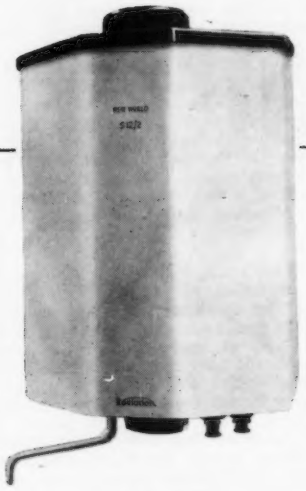

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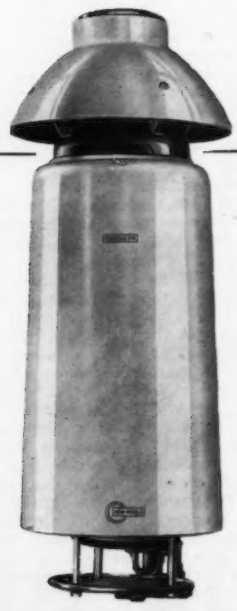
The CIRCULYN C.28



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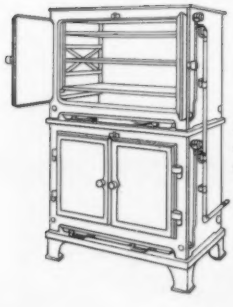
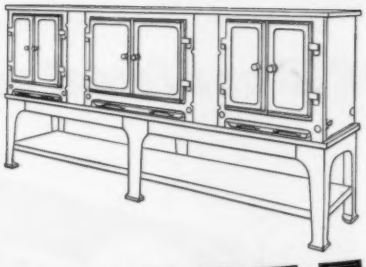
other types of roasting oven



A Vertical Battery of two ovens on a short stand.



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912

North Western Extensions and Reconstruction

Progress in the Groups

STEADY recovery in gas sales during the June quarter in the area of the North Western Gas Board was accompanied by consistent progress in the extensions and reconstruction work throughout the operating groups. The *Bulletin*, from which we quoted in our last issue the quarter's statistics for gas and coke sales, gives the following information concerning progress towards improved manufacturing and distributing plant.

The second half of the new 4½ mill. cu.ft. per day continuous vertical retort production plant at the Bradford Road works, Manchester, went into operation during the quarter. Construction of this plant was begun in January, 1949, and the first half was completed during the September quarter of 1952. Work is still in progress on the new 6 mill. cu.ft. horizontal retort plant and on the two new carburetted water gas plants.

It is anticipated that the horizontal retorts will be ready for operation by the autumn of 1954. The capacity of the Bradford Road works will then be some 28 mill. cu.ft. per day.

Reconstruction and extension of production plant at the Salford works reached a further stage during the quarter when the 1 mill. cu.ft. per day chamber oven plant, on which work was begun about 18 months ago, went into production. Work is still in progress on the 2 mill. cu.ft. per day continuous vertical retort installation, and it is anticipated that this will be completed by January, 1954. The capacity of the Salford works will then have been raised from 8.5 mill. cu.ft. at vesting date to about 14 mill. cu.ft.

Salford Purifiers

During the quarter the Board authorised the installation of new oxide purification plant at the Salford works, with a capacity of 7 mill. cu.ft. per day, at a cost of £169,000. The existing plant was installed between 1878 and 1899 and is now structurally unsound.

The new 4½ mill. cu.ft. carburetted water gas plant at the Linacre works of the Liverpool Group went into operation in February. This plant is required to maintain supplies until the completion of the new 14 mill. cu.ft. per day carbonising plant at the Garston works in the same group. Subsequently, it will be used to cover load fluctuations in the area of the Liverpool grid.

With the addition of the new water gas plant the capacity of the Linacre works has been raised, since 1949, from 20.3 mill. cu.ft. to approximately 25 mill. cu.ft. per day.

In accordance with the scheme of interlinkage between the Manchester Group and Tyldesley, production of gas at Tyldesley ceased during the quarter, and consumers in the district are now supplied by the Manchester grid. The Leigh district is also partly supplied from the Manchester grid by a connection via Salford and Radcliffe. Complete supply from the Manchester area will be provided when the grid main from Partington over the Ship Canal via Cadishead is completed. The inclusion of Tyldesley in the Manchester grid has made it possible to deliver gas into holders at Tyldesley at some 2d. per therm less than local production costs.

Construction has now begun of the new coke handling plant at the Brierfield (Nelson) works of the Burnley Group. The installation of this plant will enable the entire coke output of the Brierfield works to be efficiently graded and will result in a corresponding improvement in the service offered to coke consumers in the Nelson area. It is anticipated that construction will be completed during the spring of 1954.

Construction of a new coke screening plant at the Cloughfold (Rossendale) works of the Bury-Rossendale Group was begun during the quarter. The estimated cost of this plant is £45,000 and it is expected that work will be completed in about nine months.

The long distance main connecting the Blackpool undertaking with the Eastham (St. Annes) works was completed during the quarter. This link will, in the first instance, provide a partial bulk supply to St. Annes. The Eastham works can now be operated at 100% base-load capacity, while fluctuations in demand can be covered entirely by water gas supplies from the Marton works of the Blackpool undertaking.

As a result of the completion of this link it has been possible to discontinue temporarily the use of the gasholder at Eastham, which has for some time been in a dangerous condition but could not be withdrawn from service owing to lack of alternative storage capacity. Thus the completion of the long distance supply system has made it possible to avoid expenditure of some £50,000 on the construction of a new holder, which would otherwise have been necessary.

Work has begun on the construction of a new 500,000 cu.ft. capacity gasholder in an existing tank at the Fleetwood works. The replacement of storage plant at these works has been necessary for some time, but owing to the increase in demand for gas in the area it was not possible to discontinue the use of existing plant. By using the new long distance link with Blackpool, supplies can now be maintained while the work is in progress.

Mid-Cheshire Linkage

During the quarter production of gas was suspended at the Winsford and Northwick works of the Mid-Cheshire Group. This was in accordance with the Board's plan for interlinkage in the Mid-Cheshire area, based on bulk supply from the Partington works in the Manchester Group.

The Mid-Cheshire grid is now complete up to Sandbach. Future plans comprise a further extension to include Nantwich and Crewe.

Work has begun on the first stage of the major extension of the Lostock Hall works of the Preston Group. The first stage provides for a 4 mill. cu.ft. per day carbonising plant. Ultimately, it is planned to add a second unit of the same capacity. This further addition, together with accompanying water gas plant, will bring the capacity of the works to about 19 mill. cu.ft. per day, compared with 9.6 mill. cu.ft. at vesting date.

The Board has authorised the laying of an 18 in. main between the Warrington works of the South Lancashire Group and the East Lancashire Road. This will afford interlinkage between Warrington, Newton-le-Willows and St. Helens. It will also provide a connection of limited capacity through existing mains between Warrington and Wigan. The intention is to continue the main from the East Lancashire Road direct into Wigan, in order to give complete interlinkage.

The length of the project at present authorised is some 5½ miles, and the cost £91,000. It is anticipated that work will be completed in November of this year.

Work on the foundations of a new 1.1 mill. cu.ft. carburetted water gas plant at the Chester works was begun during the quarter. The cost of this plant will be some £45,000, and its purpose is to enable these works to meet the very rapid rise in gas demand in both Chester and Ellesmere Port. Reconstruction of the distributing system in the Chester area, which has been a major factor in stimulating demand, was continued during the quarter.

New gas supplies connected in the Board's area during the June quarter were: New council housing, 6,396; private development housing, 945; new supplies into existing houses, 909; new public lamps, 53; total, 8,303.

Conference on Welded Structures

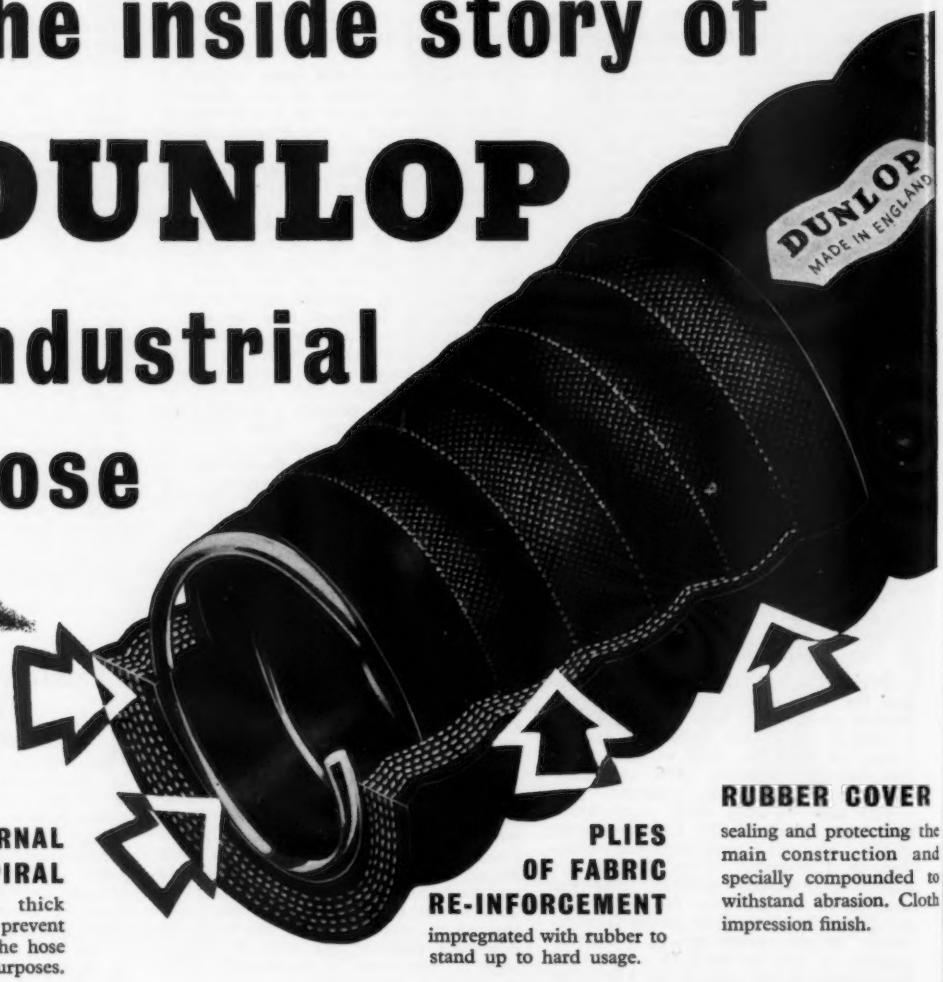
A CONFERENCE to review present knowledge and outstanding problems in the design, fabrication and erection of welded steel structures is to be held at the Institution of Civil Engineers from November 23 to 27 inclusive. The organisation is being undertaken by a joint committee appointed by the Ministry of Works, the Institution of Civil Engineers and the Institution of Structural Engineers, with the support of the Admiralty, War Office, Ministry of Supply, Ministry of Transport, and Department of Scientific and Industrial Research.

The conference is open to all interested in the subject, who register as members. Applications for membership should be made to the Joint Honorary Secretaries, Conference on Welded Structures, Institution of Civil Engineers, Great George Street, London, S.W.1, from whom application forms can be obtained.

Eleven topics have been chosen for discussion. The procedure at the conference will be to give the author of the paper a short time to introduce his paper, leaving the rest of the session free for general discussion. The author will be given an opportunity, at the end of the discussion, to reply briefly to the points raised.

The papers will include one by M. Noone, M.I.MECH.E., on 'Standing Oil Tanks and Gasholders.' Advance copies of papers will be issued to all members before the conference. After the conference, the papers will be published in book form as a permanent record of the proceedings.

The inside story of DUNLOP Industrial Hose



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STILL GOING STRONG

THIRTY-EIGHT employees of the North Thames Gas Board were presented with long service Awards by Mr. Michael Milne-Watson, C.B.E., at a ceremony held recently at Westminster. Each employee had completed 40 years' service in the gas industry.

Among those who received an award was Miss A. Morley, the first woman employee of the former Gas Light and Coke Company to receive an award at a long service presentation ceremony.

When 16 years old Miss Morley joined the Gas Light and Coke Company as a shorthand-typist and was employed at the Chief Office in Horseferry Road. After four years she was in charge of a small group of typists and by 1939 was supervising a department of 28 typists.

After the presentation by Mr. Michael Milne-Watson, Miss Morley received gifts from her colleagues. In this photograph are Miss Daniels, Mr. L. H. Locke, Mrs. Skinner, Miss Morley, and Mr. A. E. Burges. The two ladies are on Miss Morley's staff, and Mr. Locke and Mr. Burges, also of the District Office at Westminster, were among the other recipients of long service presentations at the same ceremony.

In addition to the award from the Board, Miss Morley received from her colleagues a gift of a diamante necklace and a bouquet of carnations to mark the occasion.

'WILLIAM DIETERICHS' PRIZE WINNER

SIXTEEN year old apprentice David Butcher has been awarded the 'William Dieterichs' prize by the North Thames Gas Board as the best apprentice during the past term.

The prize was instituted by the North Thames Gas Board in memory of the late Mr. William Dieterichs, a former apprentice with the Board, who became Manager of its research and training centre at Watson House, Fulham. Open to all the Board's apprentices at Fulham, Slough, and Stratford, the competition is held each term. The award takes the form of a prize for the winner, and the 'William Dieterichs' shield which is held by and displayed in the workshops where the winner was initially trained. At a recent ceremony at Watson House, David Butcher was presented with his prize (a set of drawing instruments) by Mr. A. E. Hetherington, the Board's Central Divisional Manager. Among those present were David's parents and sister. Mr. Butcher, Senior, is employed by the Board in its Seven Sisters Road Stores. A few weeks ago, David was sent on a month's course by the Board to the Outward Bound Sea School at Aberdovey. He completed this course satisfactorily, obtaining a merit certificate.

Mr. A. E. Hetherington, Divisional Manager, makes the presentation.

Deputy Chairmen of Gas Consultative Councils

THE Minister of Fuel and Power has made a number of appointments and reappointments to the posts of Deputy Chairmen of Gas Consultative Councils. The holders of these offices are now as follows:—

SCOTTISH: Baillie S. Leitch.
NORTHERN: Alderman Mrs. B. F. C. Adams.
NORTH WESTERN: Miss A. V. Baynes, F.S.H.M. (vice Councillor Mrs. E. E. Beavan).
NORTH EASTERN: Councillor Mrs. J. Smith, J.P.
EAST MIDLANDS: Alderman Mrs. R. Hodson.
WEST MIDLANDS: Alderman J. H. Lewis, O.B.E., J.P. (vice Councillor S. J. Brown).
WALES: Miss D. E. Miskin, B.A., F.S.W.H.M.
EASTERN: Mr. C. H. Frewer (vice Alderman Mrs. M. C. Irving).
NORTH THAMES: Mrs. A. Topping (vice Councillor Mrs. W. Kader).
SOUTH EASTERN: Mrs. D. N. Rathbone.
SOUTHERN: Councillor Mrs. A. E. M. Oliver, M.B.E.
SOUTH WESTERN: Miss J. Stephen.

Diary

Sept. 3-9.—BUILDING PLANT EXHIBITION, organised by the Ministry of Works. Goose Fair Site, Nottingham.

Sept. 3-17.—ENGINEERING, MARINE, AND WELDING EXHIBITION (including Chemical Plant Exhibition). Gas Council exhibit. Olympia.

Sept. 9.—SOUTH WESTERN G.C.C.: 34, Bridge Street, Taunton, 11 a.m.

Sept. 10.—WALES AND MONMOUTHSHIRE SECTION, I.G.E.: Annual General Meeting, Broadcasting Hall, Trinity College, Carmarthen; Discussion on the Report of the visit of the Gas Industry Productivity Team to the United States to be opened by E. M. Edwards, Member, Wales Gas Board.

Sept. 15.—IRISH GAS ASSOCIATION: Annual Meeting, Tramore.

Sept. 15-18.—ASSOCIATION OF PUBLIC LIGHTING ENGINEERS: Annual Conference and Exhibition of Street Lighting Equipment (including Gas Council display), Liverpool.

Sept. 21.—EASTERN G.C.C.: Connaught Rooms, Kingsway, London, W.C.2, 2 p.m.

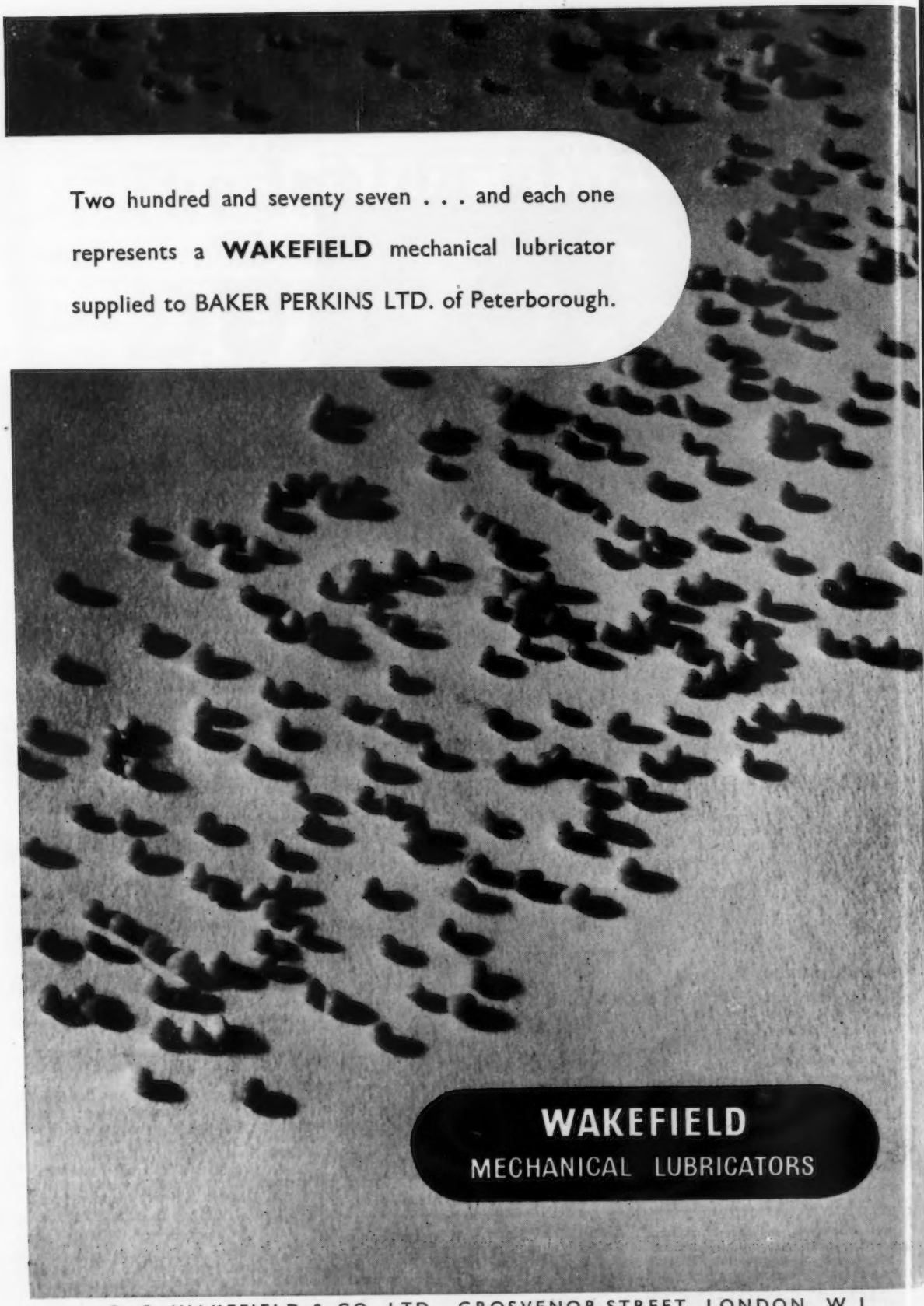
Sept. 23.—SCOTTISH ASSOCIATION OF GAS MANAGERS: Annual General Meeting, Edinburgh.

Sept. 23.—NORTH WESTERN FUEL LUNCHEON CLUB; Address by Mr. Gerald Nabarro, M.P.

Sept. 25.—MANCHESTER AND DISTRICT SECTION, I.G.E.: Visit to Petrochemicals, Ltd., Irlam, Manchester.

Oct. 1.—NORTH OF ENGLAND SECTION, I.G.E., and NORTHERN JUNIORS: Joint meeting. Discussion on Report of Gas Industry Productivity Team's visit to the United States. W. H. B. Porter and D. J. Colvin will answer questions. Northern Gas Board Assembly Hall, Market Street, Newcastle-upon-Tyne, 2.30 p.m.

W. E. Bray & Co., Ltd., announce that as from September 1, in pursuance of the company's policy, the prices of the Bray Hydraloader are being substantially reduced.


Two hundred and seventy seven . . . and each one represents a WAKEFIELD mechanical lubricator supplied to BAKER PERKINS LTD. of Peterborough.
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MECHANICAL LUBRICATORS
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Coal Mixtures

SINCE the introduction of nutty slack last winter, the National Coal Board has experimented with the production of special mixtures designed to give satisfaction on ordinary open fires as well as modern draught-controlled grates. Once the experiments are perfected, additional coal will be available for the householder at about the same price as Grade four—£6 6s. 5d. a ton. Nutty slack will still be available.

Samples of these mixtures have been distributed to merchants, and the Board is confident of confirmation that the coal can be used successfully.

The coal used is from the East and West Midlands—source of the best domestic sorts—screened to exclude fines and to a top size of 4 in.

Part Time Courses

THE Sheffield College of Commerce and Technology, in its Department of Building prospectus for the 1953-54 session, gives details of part-time and evening courses in gas fitting, gas supply and civil engineering covering gas engineering. The evening course in technology of gas supply partially covers the subjects required for the Certificate of the Institution of Gas Engineers for Salesmanship and Consumer Service.

Enrolment for the classes will be from September 7 to 11 inclusive, and prospective students should obtain a copy of the prospectus from the Principal at Salmon Pastures, Warren Street, Sheffield 4.

The College had seven City and Guilds of London gas fitting examination successes in 1952, with two first class and five second class passes.

Chemical Engineering Pioneer

ANNOUNCING the George E. Davis Memorial Lecture, to be given by Mr. Norman Swindin, M.I.CHEM.E., in the Reynolds Hall, College of Technology, Manchester, on October 10, the Joint Hon. Secretaries of the Institution of Chemical Engineers state that George E. Davis is recognised throughout the English-speaking world as the pioneer in chemical engineering. Addressing a meeting on chemical engineering at the Centenary of Engineering in Chicago, U.S.A., in 1952, Professor W. K. Lewis, Massachusetts Institute of Technology, is reported to have said: 'The first truly constructive step towards the establishment of the new profession came in the recognition that the problem was primarily one of education. The credit for this belongs to George E. Davis, who, in 1887, gave the first course of lectures on chemical engineering in the Manchester Technical School. These formed the basis for his two-volume Handbook of Chemical Engineering, published in Manchester in 1901.

'It is fitting,' they continue, 'that this lecture is being organised by the North Western Branch of the Institution which has its headquarters in Manchester, that the lecture will be given in Manchester, and that Mr. Norman Swindin, a former pupil of Mr. George E. Davis, will be the lecturer. The lecture will provide an opportunity for chemical engineers to demonstrate their faith in the principles first enunciated by Mr. George E. Davis and to pay their respects to the memory of the pioneer of their profession.

HEATING UP GREENWICH COKE OVENS

THE initial heating up of a new battery of coke ovens was carried out on August 11, at the East Greenwich Works of the South Eastern Gas Board. Mr. W. K. Hutchison, Chairman of the South Eastern Gas Board, inaugurated the procedure by lighting the heating gas in the first oven. The next two ovens were lit by Mr. F. C. Walker, District Organiser of the Southern District of the National Union of General and Municipal Workers, and Mr. M. R. Butler, Secretary of the Elected Members of the Joint Consultative Committee.

Deputy Chief Engineer; and Mr. T. W. Gibson, Engineer, Metropolitan Division, attended to inspect the progress of constructional work. Members of the Works Joint Consultative Committee were present to witness the inauguration.

Following the inspection and lighting up of the installation, the gathering was addressed briefly by the Chairman of the Board, and suitable replies were contributed by Mr. Barritt and the representatives of the trade unions. In their remarks the speakers recognised that large scale modernisation presents special problems, but it was felt that the method of consultation and co-operative goodwill as between management and staff would lead to a solution beneficial to all concerned, including the Board's customers.

Mr. W. K. Hutchison, Chairman of the South Eastern Gas Board, lighting the heating gas in the first oven.

The new installation consists of a battery of 22 coke ovens, designed and erected by Simon-Carves, Ltd., Cheadle Heath, Stockport, and their completion will mark a further step forward in the policy of the South Eastern Gas Board in modernising its gasmaking plant with a view to economy in production.

The ovens are capable of carbonising 500 tons of coal per day, resulting in the production of some 7 mill. cu.ft. of gas per day and are expected to be fully commissioned by the end of this month.

Simon-Carves, Ltd., were represented by Mr. D. Barritt, Managing Director, and Mr. E. W. Green, Superintendent of Works and Operation, Coke Ovens and Washeries Department. Mr. R. Prince, Chief Engineer; Mr. C. Stott,

Oil Search in Nigeria.—The Shell D'Arcy Exploration Co. of Nigeria, Ltd., which has already spend more than £5 mill. on its exploration programme, is continuing its search for mineral oil. It is reported, but not confirmed, that oil has been discovered at Illah in Asaba Division. To speed up the survey work, large areas of the country, including the whole of the Niger Delta, have been photographed from the air.

Paint Committee Changes

THE Board of Trade has decided on various changes in the character and composition of the Paint Advisory Committee, originally set up 10 years ago to advise the Government on the problems of war-time control of the paint industry. The Board of Trade now thinks that the committee should have members representing the three trade associations and the export group, as well as its independent members; and trade union representation should be widened.

The Chairman will continue to be a senior Board of Trade official. The terms of reference will be 'to advise the Board of Trade on all matters affecting the paint industry.' Its membership will be as follows: Independent Members: H. W. Bidgood, J. Clarkson, C. A. F. Hastilow, R. B. E. Jackson, C. R. Petrie, E. P. Reynolds. Members representing trade associations: J. W. Cole (as President of the National Paint Federation); C. A. Carter (as President of the Society of British Paint Manufacturers); D. E. Roe (Paint Manufacturers and Allied Trades Association); and S. W. Greig (as Chairman of the Export Group of the Paint Industry). Members representing the trade unions: A. W. Inman (National Union of General and Municipal Workers); A. H. Roullier (Transport and General Workers Union); and T. Clare (Union of Shop, Distributive and Allied Workers).

In addition the committee can co-opt members of the industry with special knowledge in any field. The committee has particularly in mind that, if problems of application and distribution were to be discussed, it might co-opt Mr. V. W. Hops (Federation of Painting Contractors) and Mr. A. E. L. Robey (Building Industry Distributors).

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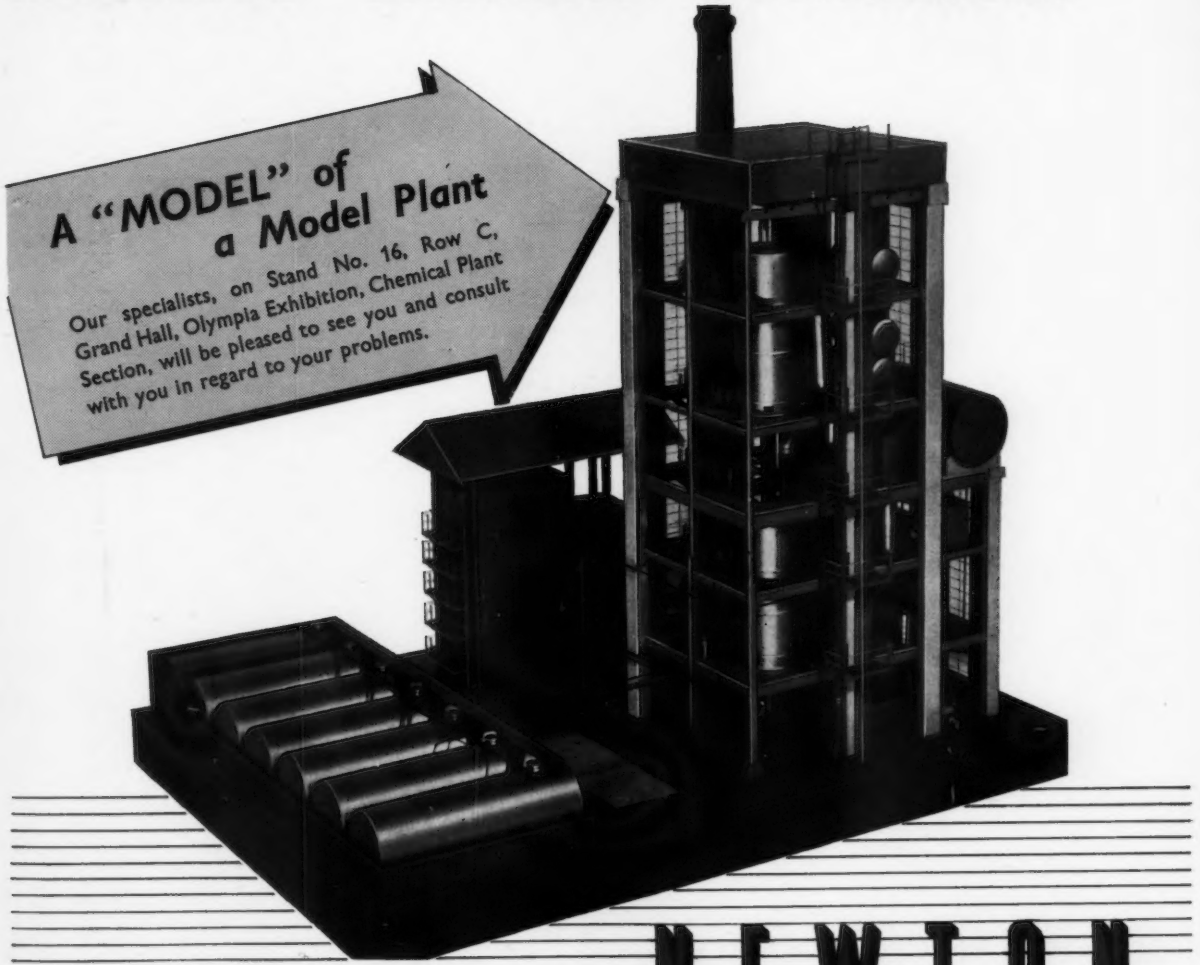
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Review of Exhibits

In the following pages are described exhibits likely to be of interest to the gas industry visitor. We would point out that the exhibition, which opens tomorrow, September 3, may be seen until September 17, and that readers who take their GAS JOURNAL with them are enabled to find stands which concern them by means of the stand numbers included in each paragraph of this review; in this connection 'E.H.' indicates Empire Hall, 'N.H.' indicates National Hall, and 'G.H.' Grand Hall.

New Recording Instruments

Accurate Recording Instrument Company

Aric Works, Garth Road, Lower Morden, Surrey.

STAND 4, ROW R, GROUND FLOOR, N.H.

This Company has been designing and manufacturing instruments of high quality for over 25 years, and many of their products are standard equipment in organisations and companies whose names are household words throughout the world. A number of new instruments of interesting design are shown, including differential pressure gauges and instruments designed for special purposes. The main range, however, is of orthodox design temperature, pressure and vacuum indicators, recorders and controllers. A number of these have special features covered by world-wide patents, but the emphasis is not so much on novelty or originality as on accuracy, reliability and robustness.

Great care is taken to see that only the finest materials, and exactly the right materials are used for each particular purpose, and the highest standards of workmanship are rigidly maintained. Every instrument is covered by the 'ARIC' two-year guarantee, which ensures that none goes out except after the most rigid inspection and testing.

Spot Welding Machines

A.R.O. Machinery Co., Ltd.

18, Madrid Road, London, S.W.13.

STAND 3, ROW V, GROUND FLOOR, E.H.

A wide range of robust spot welding machines is shown, including bench, portable and pedestal types. The portable equipment is capable of relatively heavy work and yet light enough to be taken to the job. In both models P271 and P272, the arms and the weld timers are two separate units connected by a flexible lead. The welding transformers are built into the gun itself and this is a feature of other machines manufactured by the Company. The overall size of the transformers is very small as compared to normal practice owing to the reduction in length of the secondary leads to the electrodes.

These welding guns carry 17 KVA transformers. The forging pressure can be varied between 12-500 lb. per sq. in. to suit different thicknesses of material. The timing unit can be placed at any distance away from the welding head, in a place of safety if required. The model P272 is the water cooled version of the P271, which is air cooled. On the P272 the electrode tip pressure has been increased from 180 lb. to 350 lb.

Three different models of timing equipment are available, each of which is simple in design and can be serviced by an electrician. Of these the timer 'D' is remarkable because of a thermic compensator which makes the spot welding of rusty and/or scaly metals possible. Without relying either on the judgment of the operator or the need for re-setting, a guaranteed even result will be obtained with this timer on unevenly rusty or scaly sheet. Another timer incorporates a nine-position welding intensity control which is designed for work on thinner gauges than 20 × 20 S.W.G. mild steel, such as work on wire, etc., etc. The built-in booster unit provides extra voltage in the case of insufficient or faulty mains supply.

A range of different electrode carriers is available for both of the portable machines described. Extended arms may be used. Electrode holders are interchangeable. They can be removed by loosening one nut and are secured in the holders by taper pins or cams. They are manufactured from Cu-Cr alloy which gives improved mechanical properties at high temperature compared with copper. This is the feature which allows the model P271 to be used without water cooling. The bench and pedestal type resistance welders are all suitable for welding mild steel as well as light alloys.

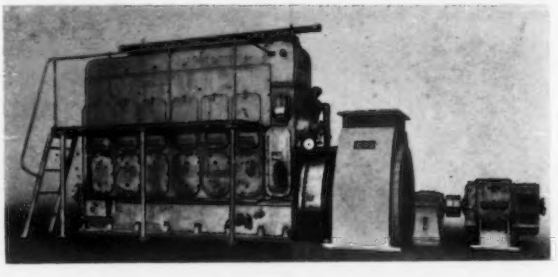
Diesel Generating Plant

W. H. Allen, Sons & Co., Ltd.

Queens Engineering Works, Bedford.

STAND 1, ROW D, GROUND FLOOR, G.H.

The exhibits demonstrate some of the specialised activities of the Company in the design and construction of power generating plant, pumping machinery, and electrical equipment for marine service, the essential services, and all branches of industry. The Allen machinery and equipment includes a complete diesel engine generating set, an epicyclic gear unit, also a set of epicyclic gear internals in motion, as well as a range of component parts for various designs and applications of this type of gearing. In addition, there are different types of A.C. and D.C. electric motors and control gear, the impeller for a large centrifugal main circulating water-pump, a steam turbine rotor, and displays of photographs showing many Allen machinery installations.



This six cylinder, 333 r.p.m. two-stroke diesel engine direct coupled to a 500 kW Allen alternator is shown by W. H. Allen, Sons & Co. It is one of three diesel generating sets for mine power stations in Australia.

The largest exhibit on the stand is a 500-kW diesel generating set, comprising a 6-cylinder, 333-r.p.m. engine directly-coupled to a 588-kVA, 0.85 power-factor alternator, which is also of Allen make. This type of unit is constructed in 3- to 8-cylinder sizes for power outputs from 218 to 750-kW.

Also displayed on the stand are various units of 'Allen-Stœckicht' epicyclic gearing, indicating some of the duties and applications for which this type of gearing is employed, and it is of interest to note that these gear units are being supplied for turbine and other forms of drive for the transmission of powers up to 5,500 h.p., for both industrial and marine service. Among the many applications for which Allen-Stœckicht double-helical epicyclic gears are particularly adaptable are gas turbine and steam turbine drives, and test rigs. A complete double-reduction, double-helical, epicyclic gear for a 650 h.p., 16,500/600 r.p.m. steam turbo-generator is exhibited, with the top-half cover removed to show the gear internals. The gear unit consists of two epicyclic reduction trains in series, the first train being a star gear and the second a planetary gear. Besides providing for this speed reduction in the neatest possible way, the gearbox low-speed-shaft bearing supports half the weight of the generator armature and the gearcase supports half the weight of the turbine at the high-speed end.

The other epicyclic gear which can be seen on the Allen stand, is a unit with compound planet wheels for a 72 h.p. 16,000/775 r.p.m. inclined-spindle steam turbine-driven main circulating pump. The gear internals only are being exhibited, these being mounted on a pedestal designed to permit the internals to be rotated continuously at a low speed in order to show the epicyclic action. Although, in service, this gear will operate on an inclined plane, for the purpose of exhibition, it will be mounted with the axis horizontal. The gear unit is provided with spur-toothed components.

Gas Engine Compressors

Alley & McLellan, Ltd.

Polmadie, Glasgow, S.2.

STAND 8, ROW K, GROUND FLOOR, G.H

The equipment exhibited includes two air compressors, a vacuum pump and a high speed steam engine, manufactured

at the Glasgow works, and also valves manufactured at the firm's Worcester works. The exhibits include one of the 'Alley-Clark' range of gas engine driven compresors, which are now manufactured under licence to the designs of Clark Bros. Co., Olean, New York, by Alley & MacLellan, Ltd.

The series 45 B.9 air compressor having a capacity of 750 cu.ft. of free air per minute to 100 lb. per sq. in. at 300 r.p.m., 150 b.h.p., is of the two-stage, two-crank, double-acting type, with the cylinders entirely isolated from the crankcase, the main advantages of the design being elimination of piston side thrust on the cylinder walls, and the prevention of oil leakage from the crankcase into the air supply. The cylinders and covers are water jacketed, the air valves are of the multiple ported small lift type, and an intercooler is provided to cool the air between stages of compression.

The air inlet has a double acting control valve to give positive closing of the inlet, so that minimum no-load running conditions are obtained, and an air inlet filter with washable or renewable elements is mounted direct on the air inlet chest.

Machines in this series are manufactured to deal with 428 cu.ft. up to 7,500 cu.ft. of free air per minute with 150 lb. per sq. in. maximum working pressure.

Heat Resisting Paint

Atlas Preservative Co., Ltd.
Fraser Road, Erith, Kent.
STAND 8, ROW H, GROUND FLOOR, G.H.

The Company concentrates very largely on the presentation of the marine side of their business, and the main exhibits relate to degreasing and descaling services and 'Atlas W.P.' deck cleanser and wood preserver.

However, readers will probably be interested in another of the Company's products, 'Atlas' high temperature resisting aluminium paint No. 2845. This product provides satisfactory protection and decoration for ferrous metals which are subjected to extreme heat. Exhaustive tests made by motor-car manufacturers, engineering firms, public utility authorities and independent research establishments, have proved that this aluminium paint will withstand a temperature of 600°C. without damage to the paint film or loss of adhesion, and with no marked loss of decorative value. Such is its durability that a coated metal plate can be brought to dull red heat and then immediately plunged into cold water. Even this unusually severe treatment will be found not to have damaged the paint film nor affected its adhesion.

Coupled to its performance on really hot surfaces, 'Atlas' high temperature resisting aluminium paint No. 2845 has good weathering properties. Its uses are wide in scope: I.C. engine exhaust manifolds, boiler fire-doors, furnaces, foundry plant, coke-oven steelwork, dust extracting plant, electric furnaces, etc.

Lubricated Plug Valves

Audley Engineering Co., Ltd.
Newport, Shropshire.
STAND 7, ROW P, GROUND FLOOR, N.H.

Audley Engineering Co., Ltd., are manufacturers of the 'Audco' lubricated plug valves which have long been recognised in the gas industry. Valves are exhibited in steel, cast iron, stainless steel, monel, 'Audcoloy,' bronze, aluminium and plastics, in sizes from ½ in. to 18 in. Interesting information is available at the stand regarding an outstanding development in the field of valve lubrication. This is 'Audco' valve lubricant No. 631, which can be used in valves handling such diverse line fluids as sulphuric acid, brine, hydrocarbons, bitumen, dyphenyls, etc., at temperatures from 0°F. to 620°F. There is also a working exhibit of a valve operated by the Electro-Hydraulic system with push-button remote control, and also a high pressure oil well head assembly and Christmas tree equipped with Audco valves.

Handling Plant for Slurry

Babcock & Wilcox, Ltd.
Babcock House, Farringdon Street, E.C.4.
STAND 3, ROW K, GROUND FLOOR, G.H.

The main feature of the stand is large semi-circular diorama depicting the wide range of industries in which Babcock plant plays a prominent part—in power stations, gasworks, oil refineries, chemical plants, paper mills, and shipping. This diorama is supported by photographic transparencies of typical boilers, pressure vessels and mechanical handling plant, for these applications. Land boiler exhibits include a model of one of the 830,000 lb. per hr. Radiant units at present under construction for Castle Donington power station, and of high head, bi-drum and integral-furnace units, as well as photographic enlargements of typical installations. Marine boilers are represented, and there is also a working model of the 'Cyclone' steam separator used for ensuring dry steam under all conditions in both land and marine applications.

Of particular interest is a working model of a handling plant for washery slurries which, often being of a putty-like consistency, present special problems in handling. The model illustrates a number of new Babcock developments which by solving these problems, present an important contribution to the commercial utilisation of this erstwhile worthless material. Another interesting exhibit in mechanical handling is the Babcock oil-filled idler pulley for belt conveyors, which requires no routine greasing, thus enabling conveyor plants to be built with greatly reduced maintenance requirements. This exhibit is supported by a perspective drawing of the coal handling plant under construction for Castle Donington, which has a total length of more than four miles of belting.

The Babcock research organisation is represented by exhibits illustrating development in the technique of weld testing. In addition to the normal X-ray methods applied during manufacture, other non-destructive methods applicable to site testing are shown, including magnetographic techniques, ultrasonic testing where only one side of the object is available (as with butt welds in pipes) and an ultrasonic 'image' method in which a liquid suspension of metal particles is caused to show the pattern of any flaw, by differential orientation of the metal particles by an ultrasonic beam.

Tower Box Purifiers

Henry Balfour & Co., Ltd.
Durie Foundry, Leven, Fife.
STAND 13, ROW G, GROUND FLOOR. G.H.

The Company's exhibits at this exhibition comprise mainly models, the most important of which is the new Balfour-Lecocq tower box purifiers, scale 1/48. These purifiers are capable of handling 7,500,000 cu. ft. of gas per day. The Company also has a working mechanical operator for a water gas unit. This operator is shown in conjunction with an illuminated panel, clearly indicating the sequence of movement.

Other models include a cast iron ground level purifier set (scale 1/48), multi-pass vertical tubed mild steel gas condensers, cast iron static ammonia gas washers, and a spiral guided gasholder.

Lectrodryer Moisture Removers

Birlec, Ltd.
Tyburn Road, Erdington, Birmingham, 24.
STAND 18, ROW H, GROUND FLOOR, G.H.

Best known for industrial furnaces, Birlec, Ltd., have introduced this year a new product. Paper being a highly porous substance, what often seems the safest place to store documents, in the vaults downstairs, is often the most damaging. Damp atmosphere and condensed moisture cause in extreme cases mildew and even in the slightest degree, damage paper and print. Birlec, Ltd. have, during the last 15 years, marketed Lectrodryer moisture removers for industrial applications and have now developed a small unit to solve similar problems in strong rooms, filing safes, muniment rooms, library store rooms and similar places. This standard equipment is known as the BE 40 Lectrodryer and is capable of maintaining a space of 3,500 cu.ft. at 50% relative humidity (at 70°F.), or 1,750 cu.ft. at 35% relative humidity.

The BE 40 is a compact unit 26 in. × 43 in. × 38 in. and weighing about 500 lb. It requires a normal commercial electric supply of 220 V and three or four air connections (depending upon whether the unit is located inside or outside the space it is safeguarding). The BE 40 is of sheet steel construction, finished in an attractive light battleship grey. It is fully automatic in operation and requires no maintenance attention.

Birlec Lectrodryers depend on the absorbent qualities of activated alumina, which is a hard, porous, granular substance with the facility of taking up water vapour from air (or indeed, any other gas), passed through it and releasing this moisture when heated. The BE 40, therefore, contains two beds of this alumina, one of which is drying and the other being reactivated at any one time. An automatic changeover mechanism ensures that the duties of the two beds alternate on a pre-determined control cycle. Heating for reactivation is provided by elements of nickel chromium wire, rated at approximately 2½ kW.

Range of Fan Equipment

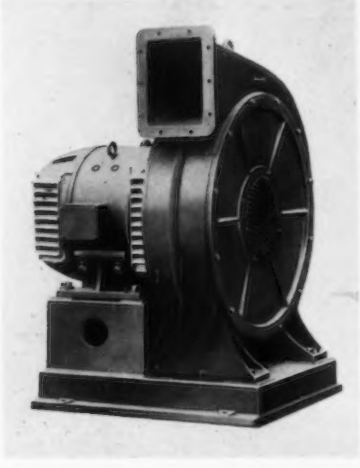
Keith Blackman, Ltd.
Mill Mead Road, London, N.17.
STAND 13, ROW J, GROUND FLOOR, G.H.

Nearly 30 different products are shown on this stand and the space at our disposal precludes mention of more than a few of them. First, the 'Tornado' 16 in. bifurcated fan for exhausting fume laden air, dust or gases. Obnoxious, corrosive or inflammable gases can also be dealt with due to the

main feature of the unit, i.e., the bifurcated fan casing with the motor completely isolated from the gas or air stream and open to atmosphere. This is easy to install, the gas or air stream being through the unit co-axially with the pipe line, in which the unit forms an integral part. A 12 in. and a 27 in. 'Tornado' fan are also shown.

The type we have illustrated is the 36 in. type 9 single inlet blowing fan which is a high efficiency blower for all kinds of foundry work, e.g., mould cooling and furnace blast. Also for high pressure cupola blowing and for pressure boosting of all types of gases in chemical and fertiliser industries, etc.

An interesting exhibit is a low-pressure gas-fired warm air unit incorporating a 15 in. diameter propeller fan directly driven by an electric motor. The unit carries an automatic lighting and extinguishing device which permits the gas to be turned on only when the pilot is alight and when the fan is running. For directing the warm air, a casing with adjustable directional louvres is fitted. Other exhibits include the 'Weldafume' unit, a dust collecting unit, and a variety of other fans.



The Tornado 36 in. type 9 single inlet high efficiency blowing fan by Keith Blackman, Ltd.

'Argonaut' Welding Process

British Oxygen Co., Ltd.

Bridgewater House, Cleveland Row, St. James's, S.W.1.

STAND 1, ROW W, GROUND FLOOR, E.H.

The recently introduced 'Argonaut' welding process is the main feature of the stand. It has great scope for all position welding on heavy gauge aluminium plate and light alloys in the ship-building industry, and it can also be used on stainless steel and copper base alloys. 'Argonaut' is a manual welding process using an inert gas shielded arc, but with a consumable electrode and automatic regulation. No flux is required and good quality welds, free from slag and inclusions, are produced. By employing multipass techniques there is no practical thickness limit as in practice very few passes are required due to the large amount of filler metal which is deposited at one time. This equipment is demonstrated, as is the new 'Argonarc' spot welding equipment which is suitable for spot welding stainless and bright mild steels. Access to one side of the joint only is required and materials up to $\frac{1}{8}$ in. may be joined to any greater thickness or sections of any shape. In addition the standard 'Argonarc' process, equipment is featured, and includes the Mark II and Mark III water-cooled torch and shield, motor generators and composite power units. Demonstrations of welding with this equipment are given on aluminium alloys, magnesium and its alloys, copper, stainless steel and heat resisting nickel alloys.

The British Oxygen Company produce a complete range of blowpipes for all welding and cutting applications. The equipment exhibited and demonstrated includes the CH and DH welding blowpipes, the 'Cutogen' No. 4 combined welding and cutting blowpipe and the light welding, lead welding and soldering and brazing blowpipes which employ mixtures of oxy/acetylene, acetylene/air and air/hydrogen. A complete range of the popular 'Cutogen' cutting blowpipes will be on show; this range includes blowpipes capable of cutting mild steel up to a thickness of 20 in. and cast iron up to 15 in. thick.

The 'Cutogen' 6 powder cutting blowpipe and allied equipment is being shown for the first time and is of particular value for cutting such metals as stainless steel, aluminium, bronze, monel, etc. Another blowpipe in this range, the B.O.C. powder washing blowpipe, which is used for removing sand defects from castings, is also exhibited. Demonstrations are also given on the 55 in. Universal cutting machine fitted with the recently introduced MC 12 cutter and the 36 in. Universal cutting machine, both using the successful 'Cutogen' one-piece nozzles.

Industrial Thermometers

British Rototherm Co., Ltd.

Merton Abbey, London, S.W.19.

STAND 18, INNER ROW, GALLERY, G.H.

A range of dial thermometers, recorders and controllers constitute the exhibits on this stand. In the sphere of bi-metal actuation, there are Rototherms with a wide variety of dial ranges, presentations, stem lengths and diameters for marine, industrial and laboratory purposes. Max./min. indicating and control/alarm thermometers are shown, with special designs for petroleum, chemical, diesel engines, farm use and most industrial applications.

Mercury-in-steel thermometers, distant reading and rigid stem models, with 4 in., 6 in. and 8 in. dials, wall or panel mounting, are exhibited, and new-styled indicator cases are also on view. Designs for special applications in industry are available, including diesel engine exhaust gas thermometers with anti-vibration head.

Single and dual pen mercury-in-steel temperature recorders, wall or panel mounting, in new styled cases, and with wet and dry bulb recorders, are shown. Portable recorders are of particular interest. A wide range of vapour pressure thermometers for industrial and other purposes, both distant reading and rigid stem models, are included; also a dough testing dial thermometer.

Single and dual pen pressure vacuum and compound recorders (to match the mercury-in-steel temperature recorders) with pressure from 10 in. W.G. are also on view.

B.T.H. Electric Products

British Thomson-Houston Co., Ltd.

Rugby.

STAND 5, ROW N, GROUND FLOOR, N.H.

Many of the exhibits are marine in character, but there are also several in the industrial field, among them a soot-blower control cubicle of the latest design, various industrial electronic equipments and electric motors from fractional horse-power sizes upwards. Examples from the wide range of B.T.H. electric motors available include a number of totally-enclosed fan-cooled British standard dimension motors now in full production. They are built to conform with B.S. Draft Specification CN. (ELE) 6814, and cover a range of three-phase, 50-cycle, squirrel-cage machines up to 20 h.p. at 4-pole speeds, with corresponding ratings at other speeds. Other exhibits of note include the new 'Stavolt' close voltage-regulation alternator and a double reduction right-angle drive gearbox which, having an efficiency of about 97½%, offers a marked improvement over the conventional worm drive which is used so often when a right angle drive is required.

Many of the exhibits are arranged as working demonstrations. These include radar equipment and a number of items of industrial electronic equipment such as a high-speed batch counter for operation at speeds up to 24,000 counts per minute, an 'Emotrol' equipment for the electronic control of a hosiery knitting machine drive, welding control panels and 'Clearcall'—the modern industrial communication system.

Automatic Clutch Couplings

Thomas Broadbent & Sons, Ltd.

Central Ironworks, Huddersfield.

STAND 18, ROW F, GROUND FLOOR, G.H.

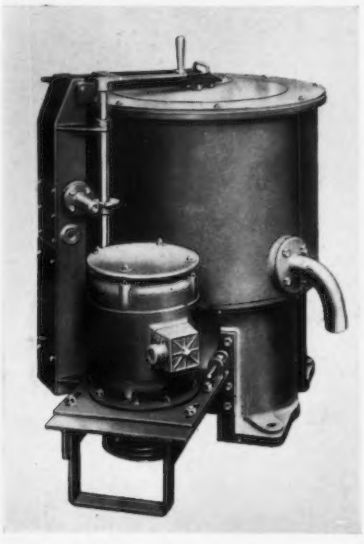
Of particular interest and making its first exhibition appearance is the new Broadbent sugar centrifugal, which combines extreme reliability with labour saving devices and quality control. The high-duty forced ventilated motor is built direct on to the main centrifugal spindle without an intermediate flexible coupling, and highly efficient braking giving reduced time cycles is electro-dynamic from full to half speed, controlled by a process timer and air operated mechanical braking is then automatically applied to stop the machine.

The 21 in. diameter perforated basket of the type 86 bolted down centrifugal is manufactured of F.D.P. stainless steel, and this machine has been specially designed for manufacture in suitable corrosion resisting materials to cover a wide range of chemical applications. The drive is by vee belt from a vertical flange mounted motor combined with an automatic centrifugal clutch pulley, and the self-balancing cover is electrically and mechanically interlocked to safeguard the operator. It is impossible to open the cover whilst the basket is revolving.

The automatic centrifugal clutch coupling exhibited is universally applied for giving smooth, shock-proof transmission, and combines simplicity and reliability with exceptional efficiency. Working parts are confined to a driver half and a driving half carrying four loose shoes lined with Ferodo on the outer face. As the motor speed in-

creases, centrifugal force throws the shoes radially outward, and they engage the driven half gradually accelerating it to full motor speed—all starting difficulties are overcome and it is also an effective safeguard against overloads, for the weight of the shoes limits the torque transmitted.

These automatic clutch couplings are manufactured in a range covering up to 30-40 H.P., where the driving unit is an electric motor on A.C. or D.C. three phase supply; if the driving unit is an internal combustion engine or an electric motor of low starting torque the clutch shoes are spring controlled to enable the motor to attain from 40%-75% of its full load speed, depending on individual requirements, before transmission commences.



Thomas Broadbent & Sons, Ltd., show this type 86 21-in. liquid bearing centrifugal for chemical processing.

Portable Compressors

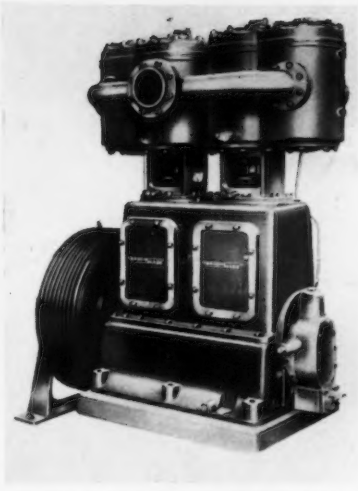
Broom & Wade, Ltd.

High Wycombe, Bucks.

STAND 11, ROW B, GROUND FLOOR, G.H.

Stationary and portable compressors and pneumatic tools covering the requirements of the Engineering Industry are exhibited on the Broom and Wade stand. The stationary compressors range from 2 cu.ft. to 1,000 cu.ft. F.A.D. A special exhibit in this range is the 'Broomwade' Type S.S. two-cylinder, single-stage double-acting compressor having pistons fitted with carbon rings, eliminating cylinder lubrication.

There is also a new addition to the well-known 'Broomwade' sleeve-valve portable air compressor range, represented by type SV.398 incorporating the latest refinements in modern compressor design.



Broom & Wade, Ltd., feature this SSIB carbon ring oilless compressor.

Travelling Grate Stokers

Clarke, Chapman & Co., Ltd.

Victoria Works, Gateshead 8. Co. Durham.

STAND 7, ROW D, GROUND FLOOR, G.H.

A model of one of three water tube boilers installed at the N.C.B. Templetown Power Station, Co. Durham, is one of the main exhibits on this stand. The boiler was specifically ordered for the purpose of burning filter coke, i.e., washery refuse from the wet coal cleaning plant. The travelling grate stokers were specially extended to enable this type of fuel to be hand fired on to the grate. Overhead fuel bunkers were incorporated in the layout of the plant to enable middlings coal to be utilised as and when required.

Also shown is a model of coal pulverising plant, the name of which—'Raymond bowl mill'—is derived from the revolving bowl into which the coal is fed and reduced to powder by spring loaded rollers. The rollers are rotated by the coal passing between the driven bowl and the rollers. The powdered coal is drawn from the bowl by an exhauster fan through a classifier which controls the fineness of the particles passing into the fan and to the burners. The whole mill operates under a minus pressure which prevents the escape of fine dust and the contamination of the atmosphere in the boiler house.

All the controls for regulating the fineness of pulverisation are outside the mill casing and can be adjusted while the mill is in operation.

A full size section of fusion welded boiler drum displayed is manufactured from Siemens Martin acid quality boiler steel 28-32 tons tensile, and the drum-end 26-30 tons tensile, the welded seams being of multi-run construction carried out under strict supervision and, after heat treatment, subjected to rigorous radiographic examination.

Sludge Disposal Pumps

Comet Pump & Engineering Co., Ltd.

Johnson Road, West Croydon, Surrey.

STAND 6, N.H. GALLERY.

The Comet Pump and Engineering Co., Ltd., have two adjacent stands in the National Hall Gallery, one being devoted to marine pumps and the other to industrial pumps. On the latter are pumps handling very heavy and intractable materials, of particular interest to all interested in the handling of tar and the like. Also shown are pumps in chrome-diffused iron, an application of great importance and pioneered by Comet. The diffusion of pure chromium into the surface of the iron produces an intensely hard and wear-resisting surface, transforming the surface into a chromium-rich alloy, highly resistant to corrosion even under elevated temperatures and eminently suitable for such applications as the handling of nitrics, etc.

The greatest interest to gas engineers may, possibly, lie on the marine stand, where the latest methods of control of fuel-oil supply, as well as sludge-disposal pumps are displayed and operating in conjunction with a purifier.

Compressed Air Equipment

Consolidated Pneumatic Tool Co., Ltd.

232, Dawes Road, London, S.W.6.

STAND 6, ROW C, GROUND FLOOR, G.H.

One of the most interesting of several new lines is the CP-NINE hand drill, a new self-rotating-percussive drill for one hand operation. This powerful little rock-drill-in-miniature can be used for all sorts of work in brick, stone, and concrete, such as drilling plug holes for plumbing and electrical installations, chasing plaster and brickwork, and making foundation holes for machinery. The outstanding feature of this tool is the speed at which it works, because it is designed on modern rock drill principles involving both rotating and percussive action. The drill has a special chuck which will take rotating drill steels for drilling, and non-rotating chisels for chipping. It weighs only 7½ lb. and has an overall length of under 15 in.

Of special interest to the chemical industry is the CP-125 scraper, which is a particularly simple yet heavy duty tool designed for the more arduous conditions of chipping and scaling often encountered in chemical works. It is a valveless tool and has ample power to remove the hard incrustations which have to be cleaned from various types of vessels.

Other exhibits include a new riveting hammer, an improved version of the CP-7 sludge pump, the CP-319M bench mounted grinder, and many other types of plant and tools. Among them is the CP-407 triple scaler, a new tool for a great variety of industrial purposes where thorough preparation is an important factor. On contracting and building

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work the CP-407 is ideal for scabbling concrete, stone dressing and bush hammering, and in other industries, too, this took can be applied for the removal of heavy incrustations of rust, paint and scale without damaging the metal surface. It is a valveless tool delivering very rapid blows which are vibratory in action.

Control Valves and Fittings

Crane, Ltd.

45-51, Leman Street, London, E.1.

STAND 5, ROW FF, FIRST FLOOR, E.H.

The company's exhibits include examples from their extensive range of malleable iron pipe fittings, gun metal, cast iron and cast steel valves.

Their products, used throughout industry wherever the control of steam, water, gas, oil or air is necessary, are made in a large variety of sizes, in many instances from $\frac{1}{8}$ in. to 16 in., many of the latter having been used in Britain's great post-war oil refinery development. Several examples of the larger valves, fitted with spur gearing, are on view. A number are sectioned to show internal parts, evenness of metal thickness, as well as an indication of the care that is exercised in the production of the company's materials. This company has recently commenced manufacture of a new line of malleable iron globe valves fitted with various alloy trims, for use in the chemical field. They are suitable for oil or gas pressures up to 250 lb. per sq. in., having threaded connections to suit either British or American standards. Finally, there is a small selection of their new heavy malleable iron fittings, 300 lb. series, with screwed American threads.

Two-Cycle Diesel Engines

Crossley Brothers, Ltd.

Openshaw, Manchester, 11.

STAND 12, ROW G, AND STAND 14, ROW H, GROUND FLOOR, G.H.

The Crossley exhibit is staged on two large side by side stands. Five full-scale two-cycle engines are shown on one of the stands, comprising diesel power units up to 1,380 b.h.p., for marine, locomotive and stationary applications. On the second stand there is an intriguing display of working models. Of historical interest is the Crossley atmospheric gas engine of 1866.

The new scavenge pump diesel engine of "Vee" design has not previously been exhibited anywhere. The engine shown is a direct-reversing type 'ERTVee,' with 12 cylinders developing 800 b.h.p. at 1,000 r.p.m. A similar non-reversing engine is available for diesel-electric traction applications and the unit shown is also closely representative of corresponding marine and stationary types. For all purposes similar engines are available up to 16-cylinder size developing 1,070 b.h.p. at 1,000 r.p.m. The engine operates on the two-cycle port-controlled loop scavenge principle with exhaust pulse pressure charging and is consequently simple, compact, competitive and generally most attractive. A rotary scavenge pump of the three lobe roots type is incorporated at the forward end.

Another interesting exhibit is the packaged power unit which incorporates a four-cylinder scavenge pump diesel engine of the 'EST' type. Developing 250 b.h.p. at 900 r.p.m. the exhibit is a self-contained unit with radiator, underbase and clutch-operated power take-off. It is designed for a variety of applications and large numbers of such sets are being successfully installed in excavators. For power requirements where heavy duty performance, ease of maintenance and mobility are major considerations the smaller type of scavenge pump diesel engine, with its simplicity and compactness, incorporated in a unit of this nature, is an attractive proposition.

'Stellite' Tools and Bits

Deloro Stellite, Ltd.

Highlands Road, Shirley, Birmingham.

STAND 3, ROW W, E.H.

'Stellite' tool bits, tipped tools, milling blades, hardfacing rod for valves, earthmoving equipment, and drills for hardened steel are the main exhibits on this stand. Demonstrations of hardfacing and drilling with the 'Stellite' hard steel drill are held.

A wide range of 'Stellite' faced components in every industry is on show, including steam and chemical valves, pump sleeves, internal combustion engine valves, and many other applications. On the castings side, both normal and precision castings which are proof against heat, corrosion and wear, are exhibited. For the first time two new rods are to be seen, alloy 'C' for forging dies and protection of components against chemical corrosion and 'Delcrome,' a low priced rod for abrasion resistance.

Pneumatic Portable Tools

Desoutter Brothers, Ltd.

The Hyde, Hendon, London, N.W.9.

STAND 2, ROW B, GROUND FLOOR, G.H.

Latest in the range of Desoutter pneumatic straight drills are the new $\frac{3}{8}$ in. and $\frac{1}{2}$ in. models fitted with the powerful S.R. type motor which develops over $\frac{3}{4}$ b.h.p. The latter is claimed to be the smallest and lightest portable drill of its type in existence. Among the new features of these drills is the adjustable exhaust deflector sleeve which can be rotated to blow exhaust air away in any direction, also the detachable side handle which can be quickly adjusted to suit the particular drilling operation. This attachment is a standard fitment to the $\frac{1}{2}$ in. drills, but is also available as an extra for the $\frac{3}{8}$ in. models if required.

A new close corner drill has been designed to supplement the existing M.2 and M.3 types and is capable of drilling $\frac{5}{16}$ dia. holes in steel to within $\frac{17}{32}$ in. of the inside face of a right angle.

A new addition to the famous 'Mighty Atom' range of pneumatic tools has been specially designed for running down nuts in almost inaccessible locations. After running the nut down, the tool is used as a ratchet spanner, but the nut cannot be over-tightened as the motor will automatically be driven in reverse against the air pressure once the required torque is obtained. This ultimate torque can be controlled to within very fine limits by regulating the air pressure through a reducing valve.

Rivet millers are designed for the rapid and accurate removal of protruding rivet heads of countersunk rivets, leaving them perfectly flush with the surrounding surface. Although the Type M.56 has now been in regular use for several years, the general changeover to the production of high speed aircraft using heavier materials has made it necessary to produce a more powerful tool—the P.56.

The SR.6 Super Rotor Drill featured by Desoutter Bros., Ltd.

Range of Rubber Products

Dunlop Rubber Co., Ltd.

Hastings House, 10, Norfolk Street, London, W.C.2.

STANDS 9 AND 11, ROW D, GROUND FLOOR, G.H.

Dunlop features a moving display of V-Belts, a disc coupling model in the complete range of eight sizes, a barrel coupling demonstration model, and a range of anti-vibration mountings. Among the special hoses are the deck washing, piston cooling, bilge pump, and oxyacetylene. Also featured here, in 60 ft. lengths, is the wire-braided high pressure hose used for coal cutting appliances, coke oven rams, and wherever air or water is under high pressure.

Here too are a couple of large processing vessels of intricate design each lined with a different type of material. A range of moulded and machined ebonite articles are also shown—Nerflex utensils, jugs, buckets and ladles, and gloves, gauntlets and aprons for use with chemicals.

Storage Battery Engineering

D.P. Battery Co., Ltd.

Bakewell, Derbyshire.

STAND 33, G.H. GALLERY.

Prominent in the field of storage battery engineering for well over 60 years, the D.P. Battery Company presents a comprehensive display of batteries specially designed for every type of industrial and marine duty. The majority of the exhibits are built to the tried and proved 'Kathanode' design which now incorporates the indestructible 'Porvic' separators. By virtue of their high capacity/weight ratio and length of life, batteries of these cells form eminently reliable and economical sources of power for traction duties. They are fitted on all the leading makes of battery electric industrial trucks, tractors, road delivery vehicles and locomotives.

The traction batteries are shown together with a group of D.P. Kathanode marine batteries. The basic design is here modified to meet the often arduous working conditions encountered by batteries engaged in regular or emergency lighting, engine starting and auxiliary duties aboard ship. Completing the Kathanode display is a selection from the special high performance range with its many special features now being supplied for diesel engine starting on main line passenger and shunting locomotives all over the world. The remainder of the D.P. exhibit is devoted to Plante stationary cells of the type designed for post office duties, emer-

gency lighting, radio transmission, railway signalling, country house lighting, switch tripping and closing in power stations and so on.

E.C.C. in Six Reigns

Electric Construction Co., Ltd.

Bushbury Engineering Works, Wolverhampton.

STAND 56, INNER ROW, GALLERY, G.H.

Under the theme 'E.C.C. in Six Reigns,' the company exhibits a D.C. motor complete with switch panel made in the 1880's, and also a diesel-driven kVA continuity alternator set with special 'No-Break' feature designed for telecommunications and other essential services. This equipment is complete with demonstration control gear and is connected to a teleprinter loaned by the G.P.O. to demonstrate how the set continues to maintain supplies when the mains are broken.

The teleprinter is arranged with an automatic recorder and is connected to the alternator set so that interested engineers and executives can demonstrate for themselves the effective way in which the set provides 'No-Break' features. Whilst prepared primarily for telecommunications and similar services, the set is, of course, of interest wherever continuity of supply is vital.

The display is completed by means of photographic reproductions of plant supplied in the reigns intervening between Queen Victoria and H.M. Elizabeth II.

The E.C.C.-Lister diesel-electric continuity sets consist of an alternator of the three-phase synchronous induction type, a cold-starting vertical diesel engine, both mounted on a common bedplate, together with flywheel, pedestal bearings, electro-magnetic clutch, necessary flexible couplings, and complete with all interconnecting wiring brought to a suitably mounted terminal box arranged for screwed conduit. The control panel is complete with all necessary main and auxiliary contactors, associated control gear mounted in rolled sheet-steel cubicle arranged for floor mounting, and provided with the necessary incoming and outgoing terminals.

Flame Failure Control

Elcontrol, Ltd.

10, Wyndham Place, London, W.1.

STAND 12, INNER ROW, GALLERY, G.H.

An interesting exhibit on the Elcontrol stand is a fully automatic ignition and flame failure control panel shown in operation fitted to a gas-fired air-heater made up for demonstration purposes at Watson House. The controller, which is for use with a very wide range of burners, gives (a) fully safe automatic ignition on lighting up, (b) immediate fuel cut-off on running flame failure, (c) automatic safe re-ignition after flame failure, and (d) automatic lock-out on fault or gas supply failure.

The Elcontrol equipment is simple and compact and designed for trouble-free operation under arduous industrial conditions. It is designed around a new electronic flame failure device which makes use of the radiation from a flame to maintain the gas valve open. A radiation sensitive head, which is a small unit, is screwed on to a standard 2 in BSP pipe attached to the burner front plate. This pipe is so positioned as to view the pilot flame. The sensing head responds to all types of flame, oil or gas, luminous or non-luminous; it is not sensitive to white hot refractory, etc.

For set-ups which use automatic high tension spark ignition, a single burner (or multiple burners which are capable of cross igniting) controlled by a magnetic gas valve, a pilot burner controlled by a magnetic gas valve, or a fan, with air flow switch, it gives the following protection: (a) Fully automatic control of all stages of ignition cycle from moment of switching on; (b) visual indication of state of control gear at all stages; (c) ignition is switched on only when combustion chamber is clear of unburned mixture; (d) the main gas valve is open only when the pilot flame is established; (e) the pilot gas valve is open only during the 'ignition on' period (which is automatically limited) or while the pilot flame remains established; (f) on flame failure both the main and pilot burners are immediately shut down and the alarm is given.

Motor Control Gear

Erskine Heap & Company

Lancashire Switchgear Works, Salford, Manchester.

STAND 34, G.H. GALLERY.

Although a wide range of switchgear and motor control gear is being exhibited on this stand, of special interest is a

A 50 mVA 3.3 kV ring main unit fitted with wing isolator by Erskine Heap & Co., Ltd.

new range E.H.T. ASTA tested switchgear. A complete 11 kV 150 mVA rupturing capacity unit is on view, together with a 11 kV 250 mVA circuit breaker fitted with patented arc control device. Of particular interest also is the MB unit which is a metal-clad vertical isolation unit which in the 400 volt range is ASTA tested to BSS. 116/1937 at 25 mVA and in the 3,300 volts tested to 50 mVA with overrating tests at 75 mVA.

Also on view are all types of air break starters, both hand-operated and push-button control, oil immersed motor control gear of the star delta, stator and rotor, and auto-transformer types, knife switches, fuses, isolating switches, ammeter and voltmeters, and all accessories required on switchboards such as indicating lamps. A No. 2 size motor operated liquid starter is also being exhibited as well as D.C. circuit breakers, panel mounting oil-break breakers and flameproof Buxton tested switchgear and motor control gear.

Indicators and Recorders

Evershed & Vignoles, Ltd.

Acton Lane Works, Chiswick, London, W.4.

STAND 5, ROW Q, N.H.

A 'Dionic' meter for measuring steam purity by the electrical conductivity method used in conjunction with the Evershed-Straub degassing condenser is one of the principal exhibits on this stand. A representative sample of steam is condensed and the meter measures its electrical conductivity which is proportional to the quantity of inorganic salts and gases dissolved in the steam. The conductivity tube, indicators and recorders are almost identical with the well-known 'Dionic' water purity meter, but in the interests of economy this particular meter is arranged to operate with a much smaller water flow.

The Evershed-Straub degassing condenser removes non-condensable gases such as ammonia, carbon dioxide and hydrogen sulphide from steam or water so that a gas-free sample may be used for conductivity determination by 'Dionic' methods. These gases, whilst comparatively innocuous in the superheaters and turbines, increase the conductivity reading and so mask the effect due to the presence of any inorganic salts. By removing the gases, readings on the meter relate solely to the salt content. The Evershed circular disc recorder has been designed for use with various types of level and pressure transmitters. The instruments are of the moving coil type and are fitted with magnetic damping. The charts have a diameter of 10½ in. and a scale length of 4⅛ in. They are scaled in terms of units transmitted and usually make one revolution in 24 hours, although seven day instruments can be supplied.

Other exhibits include two new products—a miniature recorder and a high response recorder—a syntorque rudder indicator, and an insulation tester.

Range of Lifting Appliances

Felco Hoists, Ltd.

17, Victoria Street, London, S.W.1.

STAND 8, ROW B, GROUND FLOOR, G.H.

This stand contains an impressive display of various lifting appliances, including hand-operated chain blocks, electric

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chain blocks, wire rope electric pulley blocks, handy lifts, equalising and adjuster slings, and ratchet hoists. The ratchet hoist is an entirely new line and is being exhibited for the first time. A special overload feature is incorporated which takes the form of a friction clutch, which in the event of excessive overload will slip, making the lifting operation impossible, yet at the same time it will sustain the load. This overload preventer gives greater security and safety to the operator and will reduce wear with consequent saving in cost of repairs and maintenance. Another special feature is the fact that this hoist is fitted with short link pitched chain which is completely flexible in all directions, whereas normally this type of hoist has roller type chain which is flexible in one plane only.

An interest exhibit is the Felco lorry loader with which the platform remains horizontal throughout its full travel, even when the vehicle is on an incline or road camber. Capacity load of 10 cwt. can be raised in 30 seconds by one person and the platform can be lowered to ground level in under 15 seconds. Operation is by hand winch —totally encased—and fixed underneath the vehicle without any projecting parts. The winch is entirely self-sustaining, and it is therefore possible with the platform loaded or empty to release the hold on the handle without any danger of mishap.

The platform being free from all cables or any encumbrance permits the loading of large-size packages such as machinery, transformers, etc., and the whole apparatus is fitted permanently to the vehicle and occupies the minimum of space, being housed under the the chassis or between chassis and floor when not in use.

Insulation Extraordinary

Fibreglass, Ltd.

Ravenhead, St. Helens, Lancs.

STAND 18, N.H. GALLERY.

All facets of the firm's production are displayed on panels at various points on the stand. In the sphere of heat insulation, exhibits include rigid and flexible sections for steam and hot-water pipes; wired mattresses and sewn sheets for boilers, ducts, etc.; 4½ lb. resin-bonded and sealed slabs for engine-room casings and ventilation ducts.

For cold insulation there is white wool for refrigerated spaces, 4½ lb. resin-bonded and sealed slabs. Structural insulation is represented by B fibre for air conditioned spaces and navy board. Various forms of electrical insulation and reinforced plastics are also shown on the display.

Products in Steel

Thos. Firth & John Brown, Ltd.

Atlas Works, Sheffield, 4.

STAND 11, ROW J, G.H.

Exhibits on this stand include a forged 100 MW turbo alternator shaft in high tensile alloy steel, 35 ft. 8 in. long and weighing 42 tons; a forged rotor shaft in chrome-molybdenum steel for auxiliary turbo-generator set; and a forged die block in nickel chrome molybdenum steel, for producing drop stampings for aircraft parts. Also shown are a pair of die blocks, two forged steel gear wheel rims in multiple widths, 12 ft. 9 in. and 7 ft. 3¾ in. outside diameters, forged steel rolls, drop stampings, castings, and rolled rings.

Slotted Angle System

Fisher & Ludlow, Ltd.

Bordesley Works, Birmingham, 12.

STAND 2, ROW Y, GROUND FLOOR, E.H.

The Fisher and Ludlow exhibit concentrates on two only of the many Fisholow engineering products—'Flowstrut' universal slotted angle system and 'Fisholow' open flooring systems in steel and aluminium. Both these products have many applications in the engineering and marine industries.

The 'Flowstrut' exhibit demonstrates how this slotted angle system is used for making racks, shelving, stands, guards and all those special purpose structures which can be made so quickly and at low cost with 'Flowstrut,' but which, if made in the traditional way, would be difficult and expensive to obtain.

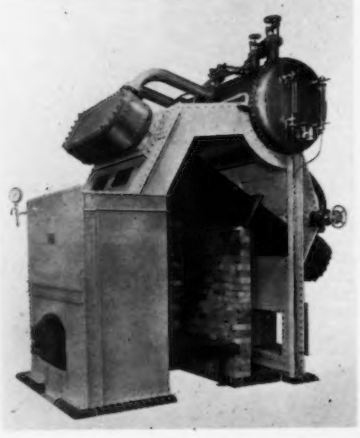
The 'Fisholow' flooring systems are also shown; these include all types of welded and riveted steel floors, as well as riveted aluminium floors for marine, engineering and chemical industries.

Water Tube Boiler

Fraser & Fraser, Ltd.

Bromley-by-Bow, London, E.3.

The principal exhibit on this stand is the 'Fraser' patent water-tube boiler, two-pass, horizontal drum type, working pressure 120 lb. per sq. in., normal evaporation 2,500 lb. per hour, arranged with standard steel-cased, refractory lined combustion chamber for hand firing coal or coke. One side of the casing has been removed showing steeply inclined staggered water tubes and baffle, furnace refractories and insulation, grate, sootblower, etc. Features of the boiler are incandescent fuel bed radiation direct to heating surface; turbulent cross flow of gases and rapid water circulation ensure maximum heat transfer rates and high efficiency. A model of the new 'Fraser-Culmen' vertical water-tube boiler, which is of a novel, high efficiency, triple pass design, is also shown.



The new 'Fraser-Culmen' vertical water tube boiler exhibited by Fraser & Fraser, Ltd.

Modern Soft Soldering

Fry's Metal Foundries, Ltd.

Tandem Works, Merton Abbey, London, S.W.19.

STAND 9, ROW N, GROUND FLOOR, N.H.

Modern soft soldering in all its aspects showing the various alloys is shown on this stand. Products include soft solders, high temperature soft solders, fusible solder, etc., and the forms of manufacture—sticks, strip, ingots, rings, washers, tape, solid wire, etc., together with a range of suitable fluxes—'Frysol' soldering fluid, 'Frysol' soldering paste flux, 'Alcho-re' paste flux, "Alcho-re' soldering fluid, etc., and composite materials—'Fryolux' solder paint, 'Fryolux' pure tin paint, 'Alcho-re' cored solder wire, and 'Alcho-re' solder cream, etc.

The exhibit emphasises the use of Fryolux solder paint, a comparatively recent development in the field of tinning and sweat soldering. This material provides the means of mass production soldering without recourse to complicated and expensive machinery. Application is dealt with in some detail and demonstration work carried out. Specimens of soldered articles clearly show the type of joints suitable to give utmost strength with maximum economy.

Automatic Welding Equipment

Fusarc, Ltd.

Team Valley Trading Estate, Gateshead-on-Tyne.

STAND 6, ROW W, GROUND FLOOR, E.H.

The Fusarc self-propelled automatic welder comprises an automatic welding head turret mounted on a power driven carriage. The welding head turret can be locked in any given position for welding in forward and reverse directions. Above the electrode feed-mechanism housing is located the control box, and the continuous electrode spool is mounted at the rear of the turret on a special support bracket provided with handles to facilitate moving the machine. The four-wheeled, rubber-tyred carriage has car type steering on the front wheels, and the rear wheels are driven by a variable speed gear through a change speed gear box with low, neutral and top gears. The machine is of robust design and capable of standing up to heavy use in shipyards and engineering works.

These welding machines are being applied in increasing numbers in engineering works and have been extensively used in the fabrication of heavy girders and large diameter vessels. The machine can run either on a special track for which grooved wheels are supplied, or it can be steered along a flat plate runway.

The equipment is usually used in conjunction with generator groups of 750 or 1,000 ampere capacity. The generator group comprises an A.C. driven motor direct coupled to the main welding generator, which is in turn direct coupled in line to an auxiliary generator providing a constant 60 V D.C. supply to feed the head motors, and act as a basis for the arc control circuit. In addition this supply is employed to operate the main welding contactor and remote control mechanism.

Gas in Industry

The Gas Council

1, Grosvenor Place, London, S.W.1.

STAND 7, ROW G, G.H.

A demonstration of flame hardening plant, using the oxy-town-gas process, is the feature of the Gas Council stand. Two of the Peddinghaus machines, supplied by Surfard, Ltd., are exhibited, one, entirely automatic, being a high production unit needing only to be fed with the components, and the other, a small machine for hardening the teeth of gears. In each case the pre-set hardening temperature is controlled by the Milliscope attachment. The Milliscope eliminates the human element in the estimation of temperature, and gives accurate and consistent hardening of all components by its immediate response to temperature changes.

The automatic unit hardens small cylindrical components, such as pins up to 2½ in. diameter, by means of the spinning method. The components are rotated at four stations on a table which revolves through 90° at the completion of the heating period, thus moving the component from the burners to the quench and bringing the next component into the heating position. The operator has only to feed the machine with components.

The speed of operation is adjusted by means of the Milliscope automatic temperature indicator so that all components may be hardened to the same depth. These machines are equipped with mechanism giving several speeds of rotation of the component (according to diameter) and means for varying the delay in moving it from the heating position to the quench. They can also be supplied with independently timed quench so that the component may have sufficient residual heat to dry off and permit (where desired) a certain amount of back tempering to take place.

This type of automatic machine has also been developed with burners which lift at the finish of the heating period so that parts such as tractor links, vices, etc., may clear the burner at the moment of shifting from the heating position to the quench. The components in this case are held stationary during the operations. These machines enable the manufacturer to harden components for the production line, so avoiding the transporting of parts from the heat treatment department and back. At the same time, the human element is almost entirely eliminated.

The second exhibit is a spinning hardening machine for small gears up to 18 in. in diameter, having a maximum width of teeth of 3¼ in. and for diametral pitches of 6 and smaller. It is fitted with automatic temperature control and hydraulic movement for quenching the gears. The gears to be hardened are rotated between oxy-town-gas burners of special design. When the gear reaches the pre-set temperature, it is lowered into the quenching medium and the burners are extinguished. After cooling for a short time the gear is then raised from the quench to the normal position and the cycle completed. This machine combines high speed and absence of distortion with low running costs and great flexibility.

Blowers, Pumps, Boosters

Sir George Godfrey & Partners, Ltd.

Hampton Road West, Hanworth, Middlesex.

STAND 4, OUTER ROW, G.H. GALLERY.

This company is exhibiting a selection of their Roots type blowers, vacuum pumps, gas boosters and superchargers. The exhibits are representative of the complete range and can deliver flows of 10 to 3.500 c.f.m. at pressures up to 10 p.s.i.

These machines are being used in large numbers in many industries and the applications include: Chemical agitation, pneumatic conveying, furnace blowing, sewage disposal, distillation, tunnel ventilation, water filtration, air slides (for moving bulk material), and of course supercharging and scavenging oil engines, both two- and four-stroke types.

In addition to the Roots machines, the firm is also exhibiting a diaphragm pump, which can deliver up to 4.5 c.f.m. at pressures up to 36 p.s.i., and a selection of pressure relief valves, manifolds, silencers, etc.

Compressors and Pumps

Hamworthy Engineering Co., Ltd.

Poole, Hampshire.

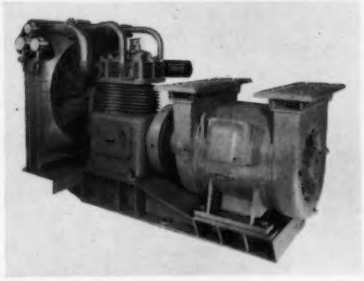
STAND 8, ROW O, N.H.

The Hamworthy 'Distar' starting air compressor is a compact self-contained unit suitable for starting industrial diesel engines and for general compressed air supply. It consists of a single acting water-cooled compressor flange mounted on the crankcase of a single cylinder, hand-starting diesel engine and driven by an overhung crankpin fitted to the engine crankshaft. A plunger type pump driven from the engine camshaft circulates cooling water through both the compressor and the engine and a radiator may be fitted to provide a closed circuit system if desired. The set will charge a 5 cu.ft. receiver to 350 p.s.i. in 18 minutes.

The Hamworthy type 2TL5A is the largest of a series of two-stage air-cooled compressors designed for general purposes where pressures up to 200 p.s.i. are required. It has a continuous rating of 135 cu.ft. min. F.A.D. to 200 p.s.i. at 850 R.P.M. The machine is direct coupled to an electric motor on a combined baseplate and incorporates an air-blast inter/after cooler unit, the fan of which is belt driven from the crankshaft. A force feed lubrication system is used, oil being supplied by an integral gear type pump operating in conjunction with an 'Auto-Klean' filter and pressure gauge. The machine has very efficient plate type valves. Relief valves and pressure gauges are fitted to each stage.

Three examples of Hamworthy pumps are exhibited. The vertical motor driven type VB5 centrifugal and VRP20 rotary are essentially marine units, but the third, a type of B.5 non-self priming horizontal centrifugal, is equally suitable for industrial use.

Hamworthy centrifugal pumps are available in three series 'B,' 'C' and 'D' with differing impeller diameters giving a wide variety of pumping characteristics. They are made in a very large number of sizes with capacities up to 1,500 gal./min. against heads up to 300 ft. Standard pumps are supplied with cast iron casings and gunmetal impellers. Multi-stage pumps are also available.



Hamworthy Engineering Co., Ltd., exhibit this two-stage compressor, 2TL5A.

Their Eightieth Year

G. A. Harvey & Co. (London), Ltd.

Greenwich Metal Works, London, S.E.7.

STAND 7, ROW M, N.H.

Considerable extensions and improvements carried out at the works have enabled this enterprising company, now in its 80th year, to meet the increasing demand for its products.

It is to facilitate the manufacture of heavy industrial and marine equipment that prompted Harveys to push forward the extensions to their heavy construction and fusion welding shops; for it is from this section of their organisation that various types of specially designed plant in welded stainless steel, monel, nickel, clad and mild steels are produced.

The display of cold rolled rings, together with the 3$\frac{1}{16}$ in. thick mild steel spun head 6 ft. 0½ in. dia. and the 1$\frac{7}{8}$ in. thick stainless steel spun head 6 ft. 3 in. dia. are typical of the service this Company has to offer. The range of gilled tubes, displayed in varied diameters and pitch of gills, and photographs of other plant and equipment portrays the ability of this Company to cater for the requirements of the engineering and marine engineering industry, not only of this country, but of the world.

The extensive range of 'Harco' perforated metals exhibited is of particular interest, and one is surprised at the innumerable patterns needed for all kinds of sifting, filtering and grading such diverse materials as coal, stone, cereals, food products, chemicals, etc. Slots 1½ in. × ⅜ in. wide punched

THE STEEL EQUIPMENT CO. LTD.

Oldbury Road, Greets Green, West Bromwich, STAFFS., ENGLAND.

Telephone : TIPton 1137-8-9. CABLES : "Equipit" West Bromwich.

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through mild steel ⅞ in. thick, to round holes .015 in. diameter, prove that the technical difficulties presented are no barrier to the craftsmen at the Greenwick Metal Works.

Another production for which Harveys are well known is 'Harco' woven wire cloth in all meshes and gauges and in all metals. Of special interest are the 'Harco' special quality wire screens used for vibrators. These screens give a far longer 'life' in service under the most exacting conditions than ordinary mild steel.

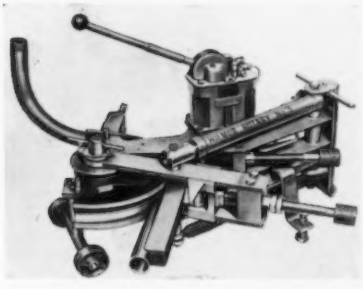
Tube Bending Machinery

Hilmor, Ltd.

65, Calshot Street, King's Cross, London, N.1.

STAND 6, ROW A, GROUND FLOOR, G.H.

Hilmor, Ltd., are displaying a selection from the largest range of light gauge tube bending machinery made in Britain. Included are lightweight bench model and portable benders designed for the gas fitter, the plumber and heating engineer, portable rotary hydraulic machines to bend all classes of tube and reduction geared general purpose benders. A selection of hand and power operated mandrel type benders of original Hilmor design will also be on show. These machines are demonstrated producing full bore distortion free bends on extra short radii in light gauge copper and steel tube, and skilled operators are in attendance to give advice and information on all tube bending matters.



Portable hydraulic 'Rotary' No. 3 to bend heavy gauge copper and steel tube and all classes of ferrous and non-ferrous tube up to 2 in. in diameter.

Steel Tube Fittings

Hipkiss Bros., Ltd.

New John Street, Blackheath, Birmingham.

STAND 6, ROW AA, FIRST FLOOR, E.H.

This stand contains an interesting range of steel tube fittings for marine, oil and general industries. A special feature of this display is the variety of fittings for high pressure work. The Company specialises in high pressure steel pipe unions and other fittings. Examples shown include weld-on types, flanged fittings or threaded B.S.P., A.P.I. or A.S.A.

Wrought Non-ferrous Metals

Imperial Chemical Industries, Ltd.

Imperial Chemical House, Millbank, London, S.W.1.

STAND 7, INNER ROW, N.H., GALLERY.

The I.C.I. exhibit includes a representative display of wrought non-ferrous metals (copper and aluminium and their alloys) manufactured by its Metals Division. Prominence is given to the Division's range of condenser tube and cooler tubes for such varied uses as land and marine power installations, oil refineries, and diesel engine oil coolers. In addition to the standard commercial alloys, such as 70/30 and 70/29/1 brass, the Division's special alloy tubes, namely 'Alumbro' aluminium brass, 'Resisco' zinc-free alloy, 'Kunifer' 30 and 'Kunifer' 30A are exhibited. These two last-named alloys are copper-nickel, containing controlled additions of iron and manganese and offering a very high degree of resistance to erosion and corrosion.

The Division also manufactures 'Kunifer' 5 copper-nickel-iron alloy tubes and sheet; exhibits include a large 16 in. diameter tube welded from 'Kunifer' 5 sheet. There is a general display of plate, sheet, strip, tube, rod, wire and extrusions in copper and aluminium and their alloys, particular attention being called to the wide range of 'Kynal' structural wrought aluminium alloy sections made by the Division. Also on show is 'Kynal' aluminium alloy treadplate and standard chequer plate.

Other special lines are domestic copper tubing, 'Kuterlon' copper tubing for underground water supplies and Fyffe 'D.D.,' 'Coneor,' 'Instantor' and 'Intex P.T.' fittings. Of interest to the general engineer is 'Kutern' high speed turning copper red, 'Kumium' for welding tips, and other uses, 'Kumanal,' an electrical resistance alloy, and 'Everdur,' for use where strength and corrosion resistant properties are required.

The I.C.I. Plastics Division is featured on stand 57, Grand Hall Gallery. This is mainly concerned with the use of 'Mouldrite' P.F. and U.F. resins for foundry purposes, and the application of 'Fluon' polytetrafluoroethylene in the engineering industry for gaskets, rings and similar purposes. Examples of nylon mouldings are also shown.

Combustion Specialists

International Combustion, Ltd.

19, Woburn Place, London, W.C.1.

STAND 5, ROW Y, E.H.

This organisation exhibits a representative selection of equipment of their manufacture including a scale model of the International Combustion boiler installation at Drakelow Electricity Generating Station of the British Electricity Authority. Another model features the application of pulverised fuel corner burners to a water-tube boiler.

An exhibit of the type 'L' louvre travelling grate stoker represents the widespread activities of the organisation in this field. The 'Usco' plate type air heater exhibit represents the activities of International Combustion, Ltd., in both electricity generating stations and industrial undertakings where this equipment is applied.

The grinding, screening and filtering division which manufactures mills, pulverisers, pumps, filters, separators and associated equipment is represented by two sectioned 'Vacseal' pumps. One of these pumps is rubber-lined and one of ferloy metal, and as with all 'Vacseal' pumps the essential feature is the fact that no sealing water is required.

A working model of a gravity bucket conveyor system represents the materials handling equipment which includes Beaumont drag scrapers, belt conveyors, ash handling plant and samplers.

In addition to the equipment of International Combustion, Ltd., Riley Stoker Co., Ltd., is represented on the same stand by a working arrangement of Syntron electric vibratory equipment. The 'Syntron' exhibit comprises a small F.O1 feeder delivery parts to a bowl feeder. The F.O1 feeder can, of course, be used for feeding materials varying from fine powders to large pieces, and troughs up to 5 ft. wide can be provided, with suitable heavy duty vibratory attachments. Capacity ranges from a few pounds to hundreds of tons per hour. The bowl feeder feeds parts one at a time, oriented to suit any subsequent process. Bowls can be provided with one, two or three flights. With both types of feeders the rate of feed is adjustable through a rheostat. In addition, a range of vibrators is shown which are widely used for attaching to hoppers, bins, chutes, etc., to promote a free flow of material.

Pipe Fittings

Kirk & Co. (Tubes), Ltd.

74-82, Paradise Street, London, S.E.16.

STAND 28, INNER ROW, GALLERY, N.H.

Kirk & Co. (Tubes), Ltd., display their 'K' Heart brand malleable iron pipe fittings and drop forged steel flanges to both British and American standards, which are widely used in the gas industry. Their display of fabricated pipework includes flanged fittings and fabricated pipework and various examples of fabrications from rolled and welded plate. Two outstanding examples of their range of fabricated pipework are a stainless steel coil 9 ft. long, and also their famous 'knitting needle' coil, which is a very intricate design and shows how steel tubing can be bent and twisted to any shape desired.

The Company is sharing their stand with two of their subsidiary companies, one of which, Samuel Russell & Co., Ltd., Northcote Street, Walsall, are showing a selection of malleable iron castings manufactured at their modern foundry, where the very latest electric annealing equipment and shot blast plant has been installed to produce a casting of a very high quality. The exhibits comprise a wide range of castings, a sword hilt of very intricate design, exhaust manifolds, handcuffs, cycle castings, and a display of various castings for the gas industry.

The other company, Cambrian Forge & Foundry, Ltd., Pontyclun, Glamorgan, exhibit a range of drop forgings in mild steel, with particular emphasis on flange forgings.

Pipe Bending Equipment

Lawler Ayers & Co., Ltd.

Broad Street House, 54, Old Broad Street, London, E.C.2.

STAND 16, INNER ROW, G.H., GALLERY.

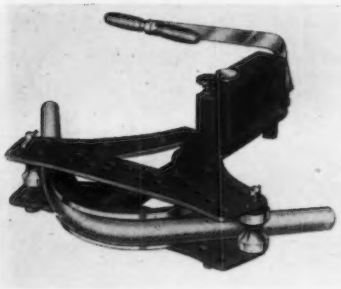
The complete new range of 'Laco' pipe bending machinery as offered to the market at the early part of the present year is to be seen and is demonstrated by qualified operators. All machines incorporate some new or modern feature of design of interest. Over 60 years' experience has been called on to ensure the most perfect and modern machines of their kind.

The 'Laco' model LH 100 pipe bending machine will bend heavy gauge gas, steam and water barrel up to 3 in. diameter. Special features include: (a)

Automatic ejection of the tube after the bending operation; (b) positive power return of a new hydraulic thrust unit of considerable power; (c) an attachment for bending light gauge tubes such as electricians' conduit. The attachments are simple to exchange and the machine is streamlined and of pleasing appearance.

The Laco 'Popular' machine is a new bender for the light gauge tubes, having a considerable capacity and such new features as an exceedingly wide base to ensure adequate bench fixing, very substantial portable stand for site work, new 'slip-on' formers enabling a rapid change-over from bending one to other pipe diameter, and very large bending capacity from ½ in. to 1½ in. diameter tubing.

The Laco 'Mandrel' machine is an entirely new innovation incorporating the mandrel principle of bending on a portable machine. The machine is entirely complete and has absolutely no loose parts. It has a bending capacity from ½ in. to 1½ in. diameter for copper tube and will produce first class bends, obviating throating normally apparent in direct bending machines.



Lawler Ayers & Co., Ltd., produce this 'Laco' model LH100 pipe bending machine for heavy gauge, barrel, up to ¾ in. diameter.

Malleable Iron Fittings

Le Bas Tube Co., Ltd.

City Wall House, 129, Finsbury Pavement, London, E.C.2.

STAND 2, ROW A, E.H.

The company's main activities have always been concentrated on the manufacture and sale of GF malleable iron fittings for use on gas, water, steam, air and oil pipelines, and the fabrication of high and low pressure pipework for similar purposes.

GF malleable iron tube fittings are made from British Whiteheart iron, specially heat treated to ensure complete malleability. They are free from porosity defects and are made in a large variety of patterns and sizes from ⅛ in. to 4 in. inclusive. They are screwed to British Standard pipe thread No. 21, tested individually to 360 lb. per sq. in. hydraulic pressure, and made generally in accordance with B.S.S. 1256/1952.

All GF fittings sold in the United Kingdom and in the British Empire are manufactured at the Britannia Iron & Steel Works, Ltd., Bedford, and their popularity is such that they are being used on many of the large heating and hot and cold water installations throughout the country by the majority of gas and water undertakings, British Railways, etc., as well as Government Departments.

At the Cyclops Iron Works, West Ferry Road, Millwall, E.14, the Company manufactures high and low pressure installations for steam, water, air, oil and gas services, coils for refrigeration and steam, either grid, helical, oval or rectangular, single or multiple. Jacketted pipes, expansion loops and headers are in continual production.

This year the Company is making two additions to their range. First, samples of GF malleable Whiteheart castings. Heat treatment is carried out after the ordinary annealing in most up-to-date furnaces in order to improve the properties and in particular the machineability of the castings. These castings should prove of interest to the motor, electrical, agricultural, and engineering industries in general.

Second, the firm is exhibiting for the first time two hand-operated screwing machines. The GA2 machine has a screwing range from ⅜ in. to 2 in. inclusive, and the GA4 machine has a screwing range from 1 in. to 4 in. inclusive. These machines can be supplied with accessories for screwing both right- and left-hand taper thread and represent a marked advance in the design and application of pipe fitters' equipment.

A New Stud Welder

Lincoln Electric Co., Ltd.

Welwyn Garden City, Herts.

STAND 5, ROW U, GROUND FLOOR, E.H.

The Lincoln stud welder, which is expected to be on the market shortly, incorporates a number of revolutionary features designed to give the apparatus a high degree of precision with the ability to reproduce perfectly executed stud welds, since, once it is set up for a given size, the conditions are exactly repeated and are not subject to variations. The apparatus itself, is, at the same time, robust, workmanlike, and able to withstand rough usage. The simplicity of its design renders it both inexpensive, easy to maintain and the operation can be carried out by an unskilled operator after a little tuition and practice.

A standard Lincoln SAE.400 motor generator will enable a range of studs from $\frac{3}{16}$ in. to ½ in. to be deposited. The Lincoln SAE.600 motor generator will further increase the range to ¼ in. Provision is made to bolt the contactor assembly to the generator control box. When not in use for stud welding the generator can be used for arc welding without adjustment. A point worth noting is that no alteration of setting is required for changing from downhand to vertical welding. The equipment is supplied with 2 × 15 ft. lengths of welding cable, a range of chucks and ferrule holders for welding $\frac{3}{16}$ to ¼ in. studs.

Also shown is the new 'Lincolnweld' fully automatic tractor unit which operates as follows: Granular flux is deposited on the joint to be welded. Bare metallic electrode is power-fed into the blanket of flux, its rate of feed controlled automatically for proper arc length. Direct current, supplied by a Lincoln welder, produces the hidden arc between the electrode and the joint. The resultant arc heat fuses the electrode and the parent metal, producing a weld. The flux adjacent to the arc melts, floats on the surface of the molten metal, then solidifies as a slag on top of the weld. Since the arc and molten metal are blanketed by flux at all times, the weld metal is completely protected from contact with the air, assuring the maximum quality of weld. This machine can be operated singularly or multiply from a SAE.600 motor generator or other Lincoln welders.

Three types of generator and a range of the latest Lincoln electrodes and accessories complete the exhibit.

Carbon and Graphite Products

Morgan Crucible Co., Ltd.

Battersea Church Road, London, S.W.11.

STAND 16, ROW D, GROUND FLOOR, G.H.

The largest portion of the stand is devoted to a display of 'Carbinert' impervious carbon and graphite and 'Carblox' refractories and chemical resisting tiles. 'Carbinert' is a material which combines many of the unique properties of carbon which are of great value to the chemical engineer. These properties include chemical resistance to most alkalis and acids, machinability, high thermal conductivity and availability in impervious forms. It is being utilised in industry in a variety of applications, particularly in heat exchange equipment handling corrosive fluids. Such equipment includes bundle-type heat exchangers, cascade coolers, plate heaters, and bayonet heaters. An interesting feature of this part of the stand is that some of these items of equipment are shown in operation.

Other exhibits include a refractory section, which features two new refractories recently introduced—the 'Super-Duty' firebrick M.R.1, and the low storage insulating refractory M.I.28. A large range of carbon products is shown, including 'Morganite' carbon seals and bearings, and another section of the stand shows sintered metal clutch linings and the 'Foliac' range of graphites, jointing compounds, greases and paints.

Welding Innovations

Murex Welding Processes, Ltd.

Waltham Cross, Herts.

STAND 2, ROW W, E.H.

Many new exhibits of outstanding interest are being shown on the stand of Murex Welding Processes. Both new electric arc welding electrodes and new arc welding equipments are being shown. The rotary equipments incorporate the new Murex brush shift generator which allows infinite variation of current irrespective of voltage. Two new single-operator transformer sets rated at 200 amps. and 375 amps., a new 750 amp. double-operator set and a 250/300 amp. single-operator diesel engine-driven equipment are also being exhibited.

Other types on view are the Murex type 50 welding transformer, a multi-operator transformer set and the now well established Murex low voltage device. It is also of interest to note that certain equipments have been sectionalised to show their internal mechanisms.

Among the several electrodes shown are the new Murex 'Speedex" electrodes which have been specially developed for high speed manual welding, and the new Murex 'Deepex' electrodes. These are mild steel electrodes of the deep penetration type. It is specially interesting to note that the Murex 'Coilex' electrode is being shown for the first time. This is a continuous extruded type of electrode of the mild steel type designed for use in existing automatic welding machines. Practical demonstrations of other electrodes in the Murex range

which covers over 70 different types are being given, and the exhibit is completed by displays of Murex welding accessories.

The new Murex arc welding generator incorporates a new brush shift principle and a special feature of the equipment is its ability to vary the current in infinite steps irrespective of the open circuit voltage. The generator is designed so that it can be incorporated in all Murex motor generator sets and also into Murex diesel and petrol engine-driven equipments. The generator, which has been specially developed for arc welding, has drooping characteristics and a current range of 15/300 amps. for continuous hand welding and currents of up to 450 amps. are available for intermittent work.

There are no series resistances and this eliminates a serious drawback to other types of arc welding generator. The controls are extremely simple in design and consist of a shunt field regulator adjusted by a cranked handle. The calibrated indicator plates eliminate the need for instruments. The absence of resistances and instruments also enables a control cabinet to be eliminated, the controls being built into the top of the end shield. The open circuit voltage can be varied between 70-90 volts and a remote control can be fitted if required. Also included is a polarity reversing switch, thus enabling the welding leads to be permanently connected to the two output terminals. Generators having other capacities are also available.

Murex Welding Processes, Ltd., show their type 375 arc-welding transformer fitted with Murex low-voltage device.

Gasworks Plant

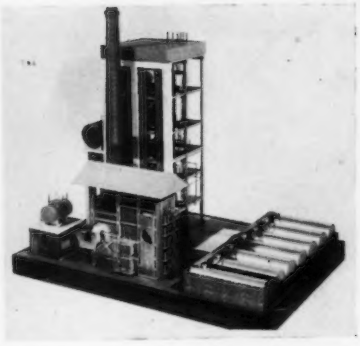
Newton, Chambers & Co., Ltd.

Thorncliffe, Sheffield.

STAND 16, ROW C, GROUND FLOOR, G.H.

A model of a 250 tons per day capacity continuous tar distillation plant with needle tube pipe still is one of the features of this stand.

Another model is of gasworks purifiers of the tower type of 10 mill. cu.ft. per day capacity, complete with Goliath crane. Also shown are examples of fuel economy equipment (needle tube elements in heat resisting iron) and examples of 'Lithcote' acid resisting linings. The display is completed by photographs, drawings and descriptive literature of chemical plant and by-product plant for gasworks and coke ovens, including gas purifiers, condensers, washers and scrubbers, benzole recovery and refining plant, gasholders, concentrated gas liquor and dephenolation plant, fractionating columns and petro-



This model of a continuous tar distillation plant is exhibited by Newton, Chambers & Co., Ltd.

leum refining plant, and storage tanks and processing vessels in mild steel and cast iron.

Power-Gas Corporation, Ltd.

Stockton-on-Tees.

STAND 19, ROW F, G.H.

In association with Ashmore, Benson, Pease, Ltd., and Rose, Downs & Thompson, Ltd., this company's principal display consists of photographs of a wide variety of installations and equipment supplied to the chemical, gas, iron and steel, fatty oil and petroleum oil industries and is supported by a model of a hydraulic controller, power cabinet and valve such as the Power-Gas Corporation regularly install with their gas plants which operate on cyclic processes. In addition, a working diagrammatic model of a Wiggins dry seal gasholder is shown. There is also a small Rosenblad spiral plate heat exchanger and a number of Meehanite castings, one of which will have been machined to show the excellent machining qualities of Meehanite. Models of the Maxoil-Duplex oil expeller and a new continuous solvent extraction plant represent two of the many products for which Rose, Downs & Thompson, Ltd., are world renowned.

An Argon-arc welding set such as Ashmore, Benson, Pease regularly use for pipe fabrication on chemical plant is shown as well as a specimen of a welded pipe joint which has been tested to destruction. Samples of crystals produced by the Krystal process are available for inspection and a selection of 'Rosedowns' hydraulic leathers.

The whole exhibit is supported by a series of flow diagrams and brochures describing the many and varied products of the companies, which include the following: Carburetted water gas, blue water gas, producer gas, oil gas, hydrogen, synthesis gas from solid, liquid and gaseous fuels, refinery hydrocarbon processing, carbon dioxide, removal, recovery and production, carbon monoxide conversion, removal and methanisation, hydrogen sulphide removal and recovery, elemental sulphur recovery, gas washing, cooling and purification, synthetic ammonia and methanol, ammonium sulphate and nitrate, industrial crystallisation, lime and dolomite calcining, edible and technical fatty oils production and processing, dust and fume control and recovery, pneumatic conveyors, sulphuric acid, blast furnace installations, auxiliaries and rolling stock, pig casting machines, sinter plants, ore and material unloading and stocking bridges, gasholders, spiral or column guided (Wiggins, Klonne and high pressure), heat exchangers, welded steel pressure vessels up to Class 1 standard, general plate fabrications, fitting and assembly, Meehanite metal castings, etc.

The latest development in solvent oil extraction for oilseeds and oleaginous material is illustrated by a semi-working model of the Rosedowns rotary continuous extractor. This model is exhibited as part of a relief diagrammatic flow-sheet of a complete plant, so that the visitor can follow the operation of the extractor and its auxiliary equipment for the recovery of the solvent from the oil and the residual meal.

Anti-Corrosion Fluids

Plus-Gas Co., Ltd.

Plus Gas House, 89, Cromwell Road, London, S.W.7.

STAND 1, ROW AA, FIRST FLOOR, E.H.

The manufacture of gas, by the very nature of the sulphur fumes given off, causes severe corrosion throughout gasworks. There are now a very large number of gasworks throughout the United Kingdom using Plus Gas formula 'A' dismantling fluid (rust remover) for the maintenance of conveyor chains, retorts, exhauster pumps, and other mechanical parts.

A specific example of the use of Plus Gas formula 'A' in the gas industry is for the removal of the lower half of the extractor worm of a West's retort. The removal of this, it being subject to extreme heat and steam in the cooling of coke, makes it a difficult matter to free. Formula 'A,' if applied and allowed to soak for 1-1½ hours, will result in it being removed quite easily with a quarter hammer. Formula 'A' is also useful for the removal of eye nuts on purifier pumps which are subject to exposure. For this particular job soaking is only required for a matter of ten minutes.

Quasi-Arc Developments

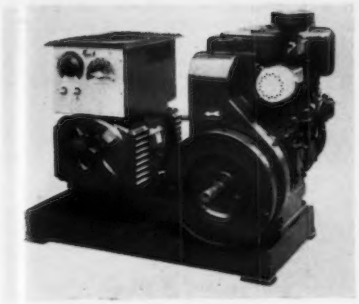
Quasi-Arc Co., Ltd.

Bilston, Staffordshire.

STAND 5, ROW 5, E.H.

An interesting exhibit is the MR.375 Quasi-Arc 'Stat-Arc' single operator metal rectifier welding set, which is the first British-made selenium plate metal rectifier arc welding set, which takes a balanced three-phase input, specially designed for the remote control of the full welding current range, by means of a single control knob. Remote control of the welding current is fitted as standard equipment, so that the welding operator has full current adjustments at the point of welding. The set, which is fan cooled and almost silent in operation, will supply the maximum welding current of 375 amperes at 30 arc volts at a 50% duty cycle. The stable volt-ampere characteristic of the D.C. output permits all types of electrodes within the current range to be easily deposited. The set may be supplied with or without wheels, ammeter and voltmeter.

The DE/180 single operator diesel engine driven set has been designed to meet a demand for a small, low priced diesel engine welding set. A Petter AVA.2 series II engine developing 11 h.p. at 1,650 r.p.m. is fitted and the drive which consists of vee pulleys and four vee belts is arranged so that the engine pulley may be used as a power



A DE180 diesel engine driven arc-welding set by the Quasi-Arc Company, Ltd.

tal e-off for driving small machines when not being used to drive the generator. The generator provides a suitably regulated output which permits the easy deposition of all types of electrodes within the current range. Although normally supplied with four hard steel floor locating pins, Andre rubber mountings may be fitted if required.

Range of Electric Trucks

Ransomes Sims & Jeffries, Ltd.

Orwell Works, Ipswich.

STAND 6, ROW M, GROUND FLOOR, N.H.

Exhibits on this stand include the Forklift 10 with 8 ft. mast, of the high free-lift type, and fitted with side shift attachment; the Forklift 20 with 10 ft. lift, fitted with Hydrum four-barrel clamp; the Forklift 40, on cushion tyres, arranged for 10 ft. lift with forks and, alternatively, crane attachment; the ENU 8 two tons capacity, four-wheel steer, elevating platform truck; and the TE tractor, with a hauling capacity of 20-30 cwts.

Manufacturers are realising, probably, as never before, that the handling and movement of materials represents an unsuspectedly high proportion of total production costs. This question is therefore a vital factor in every industrial organisation, and one which deserves the most careful consideration. Savings can be enormous and the advantages include absence of fumes, silence, instant starting and stopping and amazing manœuvrability. Ransomes have been building electric battery trucks to suit differing problems for 35 years and their present range includes trucks with fixed or elevating platforms from one to four tons capacity, crane trucks, tipping trucks, forklift trucks and electric tractors.

Ransomes' range of forklifts includes trucks of 10-40 cwt. capacity, adaptable for use with varying types of load. Two-ton platform trucks are also available with fixed or elevating platform, side tipping hopper or end tipping body types, and crane trucks suitable for heavy single pieces or loading or unloading barrels and sacks from railway waggons or lorries. Ransomes have also developed a tiering truck with elevating platform which is invaluable in cases where goods have to be loaded at different levels.

In addition, electric tractors are supplied in 20-30 cwt. and six-ton capacities. The 20-30 cwt. will haul at approximately six miles per hour and the six-ton type at approximately 3-3½ miles per hour on level routes.

The Ransomes, Sims & Jeffries, Ltd., truck with Hydrum load clamp.

Fixing Devices and Tools

Rawlplug Co., Ltd.

Cromwell Road, London, S.W.7.

STAND 6, ROW K, GROUND FLOOR, G.H.

As in previous exhibitions, the Rawlplug Company shows their wide range of fixing devices and tools. Of special interest is a large demonstration unit showing some of the many applications for Rawlplugs from the tiny No. 3 (⅛ in.) to No. 30 (1 in.) which will take a direct load of four tons.

For demonstrations of hole boring and making fixings with Rawlplug tools and devices a special brick and concrete wall is erected on the stand. This enables visitors to judge the merits of the respective demonstrations and also carry out tests themselves.

Of special interest are the demonstrations of the masonry cutting speeds of the new process 'Durium' drills. Not only will they cut through brick, tile, cement, slate, marble, terra cotta and the like with amazing speed, but because of the new process ensuring exceptional hardness of the tip, the cutting life is retained for very long periods. The almost diamond hard tip is fixed into a stem of high grade steel with a specially shaped flute to carry away the debris as the tip bites into the material. When making deep holes it is recommended that the drill is withdrawn occasionally to clear the debris and allow the tip to cool.

Another interesting exhibit is the Rawlplug drill-hammer. As its name implies, this is an attachment which when fitted to an electric drill converts its rotary motion to a percussion action, each revolution producing a blow.

An illustration of a Rawlplug Co., Ltd., exhibit, a drill hammer.

Air and Gas Compressors

Reavell & Co., Ltd.

Ranelagh Works, Ipswich.

STAND 5, ROW C, G.H.

Occupying the same stand in the Grand Hall which they have had for several previous exhibitions, this Company shows examples of most of their standard types of air and gas compressors and exhausters. These include a 1,000-cu.ft. per minute two-stage, double acting, vertical compressor for pressures up to 120 lb. per sq. in., an example of the Reavell 'Quadruplex' compressor, which is well known for its efficiency and compactness, the size shown being of about 250 cu.ft. per minute capacity at pressures up to 120 lb. per sq. in. Also displayed are four sizes of single stage, single acting, vertical compressors, including single crank machines of 17 and 39 cu.ft. and two crank machines of 82 and 155 cu.ft. per minute capacity; also examples of two stage, single acting compressors of types suitable for pressures of 100, 150, 450, 600 and 1,000 lb. per sq. in.

The two stage compressor for 100 lb. per sq. in. has a capacity of 300 cu.ft. per minute and incorporates the Company's latest features in design so as to give the highest possible output for the power absorbed. This type of machine is built with the cylinder separate from the crankcase so that using the same understructure two equal cylinders can be substituted, for single stage working to give increased capacity at lower pressures.

There is a four stage compressor for pressures up to 3,500 lb. per sq. in, and also examples of three types of rotary compressor and three types of rotary air starter motors for starting internal combustion engines.

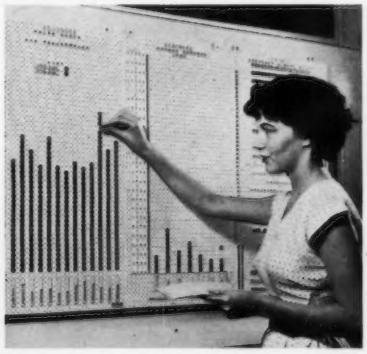
Visible Record Equipment

Remington Rand, Ltd.

Commonwealth House, 1-19, New Oxford Street, London, W.C.1.

STAND 6, ROW GG, FIRST FLOOR, E.H.

Remington Rand, Ltd., show the wide range of office equipment and the complete service that they have to offer to the engineering, marine, welding and chemical industries. The list of exhibits includes: 'Kardex' visible record equipment, showing the full range of record control applications, i.e., production, stock, etc.; 'Sched-U-Graph' visual control equipment which in clear pictorial form gives management up-to-the-minute facts of production, per-



The Remington Rand, Ltd., Graphdex Slotted Chart System.

sonnel, sales, etc.; 'Graphdex" wall charts which give a picture of the activities of any or every department of an organisation, the precise position of stock, raw materials, budgets, etc., being plotted simply and presented graphically; and Remington standard and portable typewriters equipped with engineer's keyboard.

Diaphragm Valves and Pumps

Saunders Valve Co., Ltd.

Cwmbram, Newport, Mon.

Stand 9, Inner Row, G.H. Gallery

Saunders diaphragm valves, typical of the millions in use throughout the world for fluids as simple as air and water, as delicate as foodstuffs and as difficult as abrasives and corrosives, are shown in their great variety on the Company's stand.

Examples of the new Ebonite valve, with body, bonnet and handwheel of uniform specification, are displayed. Saunders diaphragm valves with Ebonite bodies in sizes ¼ in., ⅜ in., ½ in., ¾ in. and 1 in. (with screwed connections) to which cast iron or other bonnet assemblies are fitted, as required, are known to most engineers. The new series is additional and is of five sizes: ¼ in., ¾ in., 1 in., 1½ in. and 2 in. in both screwed and flanged type. With Ebonite body, bonnet and handwheel these fulfil the need of laboratories and chemical factories where a completely non-corrodible valve is essential. As with all Saunders diaphragm valves, the three simple units—body, bonnet assembly, and diaphragm—are interchangeable with units of different specifications, so that where internal protection is adequate for the service, the less expensive cast iron bonnet and handwheel can be fitted. Alternatively, where a glass-rubber- or lead-lined valve with non-corrodible bonnet assembly is preferred, this combination can now be supplied from stock parts.

Sectional models of type 'A' and straight-through type 'K' and the various types of manual and pressure operation are shown, as well as valves developed for specific uses such as the type '070,' with easy access assembly, for edible fluids.

The range of 'Safran" centrifugal pumps, in eight sizes, is now extended by many adaptations for special purposes and by the introduction of a series of multi-stage and vertical trunk pump models. A bare shaft model of a 1 in. four-stage pump is on view, outstanding features of which are the complete elimination of a high pressure gland, the only gland being that at the suction eye of the first stage impeller. The impellers are of contra-flow type, whereby the thrust load of two stages is hydraulically balanced.

Breathing Apparatus

Siebe, Gorman & Co., Ltd.

Neptune Works, Davis Road, Tolworth, Surbiton, Surrey.

Stand 5, Row K, G.H.

This stand displays various types of industrial safety equipment. These include self-contained breathing apparatus of the oxygen and compressed air types, gas and dust respirators, oxygen resuscitating apparatus, protective clothing, face-shields, goggles, gloves and carbon-monoxide detectors.

The Mark II self-contained compressed air breathing apparatus, using ordinary atmospheric air compressed to 120 atmospheres, is of the 'open circuit' self-contained type, that is to say, the wearer's exhaled air is discharged to the atmosphere and is not purified and recirculated as in the case of the oxygen apparatus. The apparatus operates on a two-stage pressure-reducing system. The first stage reduces the pressure from that existing in the cylinder to 40 lb. per sq. in. and air at this pressure is delivered to the second stage (demand) valve. The latter is held shut by a spring-actuated lever which in turn is moved by a flexible rubber diaphragm when the wearer inhales.

When the wearer exhales the suction on the diaphragm is removed, and the lever, pulled by the spring, closes the second stage valve until the next inhalation. The valve thus acts in accordance with the demands of the user, opening on inhalation to deliver the amount of air required, and closing on exhalation; hence it derives its name.

The 'Savox' apparatus is on the same 'closed circuit' regenerative system as the other oxygen apparatus described and was designed primarily for the rescue of men trapped in mines by gas. It has a duration of 45 minutes. The whole of the apparatus is carried on the front of the wearer where it is easily manipulated, the cylinder and absorbent canister being housed in the cavity of a U-shaped breathing bag.

On Stand No. 3, Row T, underwater demonstrations are carried out in a glass-windowed diving tank.

Industrial Pumps

Sigmund Pumps, Ltd.

Terminal House, Grosvenor Gardens, London, S.W.1.

Stand 2, Row EE, E.H.

Chemical and process pumps on view are typical examples of a branch of hydraulic engineering in which the Sigmund organisation plays a leading part, and a feature of the exhibit is a scale model of one of the three distillation units at the Cardon refinery of the Shell Company of Venezuela. Sigmund process pumps, proved in the first distillation unit, were specified for the second and again for the third distillers, resulting in a 30,000 h.p. installation of Sigmund pumps in this refinery.

A scale model is again used to show yet another branch of Sigmund activities. There is, in miniature, the battery of six 33 in. by 30 in. circulating pumps at Connah's Quay power station. This 40,000 h.p. pumping station is one of a number of contracts which Sigmund Pumps have in hand for the British Electricity Authority for large circulating main boiler feed and other pumps.

New Measuring Instruments

Smiths Industrial Instruments, Ltd.

Chronos Works, North Circular Road, London, N.W.2.

Stand 29, Inner Row, N.H. Gallery

Smiths are showing on their stand a comprehensive range of measuring and indicating instruments. For example, the speed control switch has been designed to provide a very sensitive reaction to in-put speed taken from machinery. Interpretation is through magnetic induction, and manually adjustable fingers pre-set the speed below or above which the device should interrupt an electrical circuit and thus shut down the drive. A robust piece of equipment ensuring safety and efficiency in applications ranging from conveyor belts and engine governors to wind speed warning on crane installations.

A transmitter for the flame proof indicator, by Smiths Industrial Instruments, Ltd.

Wherever mechanical equipment is operating, its time of running at an average speed is an essential for estimating when maintenance is due. Smiths light duty engine service counter is suitable for light diesel and petrol engines, and a heavy duty version is designed to meet more arduous conditions. Both models count to 10,000 hours of mean revolutions and have precision mechanisms within soundly made cases.

Also to be seen on the stand are unit counters, flexible drives, stop watches, escapements, pressure gauges and mechanisms, hobs and cutters, electric railway speedometer, flameproof 'Desynn' equipment, 'Petro-flex' tubing, electric speedometers and tachometers, electric and vapour pressure thermometers and engine revolution indicators.

Pipes and Tubework

Stewarts & Lloyds, Ltd.

Brook House, Upper Brook Street, London, W.1.

Stand 7, Row E, G.H.

Stewarts and Lloyds, Ltd., with associated and subsidiary companies, are exhibiting a selected range of their products on a double-decker stand. The principal display is devoted to boiler tubes, both seamless and electric resistance weld, and manipulated pipework for high pressures and temperatures. Among the Company's products illustrated by photographs are various items of shipyard equipment, including sheer legs, tubular steel derricks, davits and masts, steel buttwelding fittings, coils, steel castings, protective linings and coverings, including glass tissue wrapping, steel tubes for many purposes, including the conveyance of steam, gas, water, oil and sewage.

Part of the stand is occupied by Stewarts & Lloyd's subsidiary, Tubewrights, Ltd., who are exhibiting a range of models of their products, including factory buildings, materials handling equipment and tubular steel bridges.

Diesel Engines and Pumps

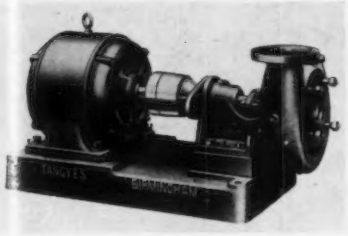
Tangyes, Ltd.

Cornwall Works, Smethwick, Birmingham.

Stand 4, Row L, Ground Floor, N.H.

Tangyes, Ltd., exhibit the following products:—A BWH418½ b.h.p. horizontal diesel engine and a P2 10 b.h.p. hori-

zontal diesel engine; a 25-ton motorised 'Universal' testing machine; a 70-ton hydraulic utility press; a 16-ton sleeving press; and a 12-ton ordinary type hydraulic jack. Pumps on display include an 'AR' type centrifugal pump; a 5 in. by 4 in. by 6 in. 'B' type 'Duplex' boiler feed pump; and two hydraulic hand pressure pumps. Two patent industrial heaters are shown, with 9 in. 'Hydralite' hydraulic jacks, totally enclosed horizontal self-oiling 'Duplex' power pump, 4¼ in. by 4 in. vertical single ramp pump, a set of 10-ton positioning jacking equipment, and a 6 in. vertical 'No-Choke' centrifugal pump.



The Tangyes, Ltd., 'A.R.' type centrifugal pump on baseplate with motor.

Automatic Controls

Teddington Industrial Equipment, Ltd.

Sunbury-on-Thames, Middlesex.

STAND 3, INNER ROW, GALLERY, N.H.

These manufacturers are exhibiting a complete range of automatic controls for industrial applications of all kinds. Individual controls are shown for application to heating, cooling, air conditioning and process control installations, where regulation of temperature, pressure, humidity, liquid level, and speed is required. Also displayed are examples of Teddington control systems with centralised control panels which are individually engineered for many process applications.

Another feature of this stand is the display of some of the latest developments in automatic protection of oil engines. Warning and shut-down equipment units which can be applied to all sizes and types of oil engines to provide continual protection against dangerous running conditions are displayed in this section.

Light Alloy Fabrications

Richard Thomas & Baldwins, Ltd.

47, Park Street, London, W.1.

STAND 5, ROW GG, 1ST FLOOR, E.H.

This stand shows some of the products of the light alloy and fabricating section of the Company, and its purpose is to emphasise how, both in steel and aluminium alloys, the Company controls the manufacturing processes through all the stages from raw material to the finished article.

A variety of fabricated articles are shown in painted, galvanised and stainless steels and in aluminium alloys, which serve to illustrate the wide range of fabricating processes, both specialised and mass production, which are operated by the Company.

The argon-arc welding of large aluminium alloy rainwater pipes—a product in which the Company has specialised for many years and of which a number of designs are displayed—is demonstrated on the stand.

Boilers and Pipes

John Thompson, Ltd.

Ettingshall, Wolverhampton.

STAND 4, ROW F, G.H.

The exhibits, as shown by the John Thompson, Ltd., Group of 16 associated companies, are typical of some of their manufactures for the marine world and chemical industry.

John Thompson (Dudley), Ltd., have a stainless steel condenser, such as they supply to the chemical industry, and they are also showing a model of their rotary pickling plant which they design and fabricate for steel manufacturers.

John Thompson (Wolverhampton), Ltd., show a pressed boiler drum end 5 ft. 6 in. diameter by 3$\frac{5}{32}$ in. thick, which will eventually form part of a steam drum for one of the water tube boilers being installed at Tilbury Power Station for the British Electricity Authority. This will be one of six boilers which are being installed, each generating 540,000 lb. of steam per hour. Scale models of two of their marine boiler installations, fabricated in the model department of John Thompson Water Tube Boilers, Ltd., are also on view.

John Thompson Water Tube Boilers, Ltd., exhibit a 'La Mont' type marine auxiliary boiler, similar to 24 which are being supplied to the order of Alfred Holt, Ltd., of Liverpool, and they also have the combustion chamber elements for a similar type of boiler showing the compact fabrication of this design.

A range of high pressure steam pipes, such as are being supplied for their associated Company's water tube boiler installations, both for this country and abroad is shown by John Thompson (Wolverhampton), Ltd., Pipework Department.

Subject to material delivery, they hope to have on view one of their rings of welded fabrication which are being made in sizes from 4ft. diameter to 12 ft. diameter and up to 8 in. thick for pressure vessels, baseplates, turntables, etc.

Lubrication Specialists

Trier Bros., Ltd.

Cumberland Works, Calder Street, Camberwell, London, S.E.5.

STAND 1, GALLERY, G.H.

The new 'Central' gun-fill grease lubricator which provides automatic grease lubrication for a few shillings is one of the featured exhibits on this stand. Another is the 'Staufferlube Multigreasors' models V.A. and V.B., centralised lubricators for oil and grease lubrication respectively. Each installation requires one hand-operated unit, as shown, and as many distribution elements as there are points of application. The novel feature of the system is that it has one grease line only for all points.

Suitable for conveyors and gasworks plant, this single grease line hand pump is one of those with which Trier Bros., Ltd., demonstrate their 'Staufertube' Multigreasors.

Three model 'Staufferlube Multigreasors' are shown in operation, mounted on a special stand, thus demonstrating the various methods of driving occurring in practice. These models operate without springs or valves and are therefore suitable for severe operating conditions, e.g., steel works, quarries, cranes, dredgers, etc.

The 'Collgraf' system of oil-free lubrication which has been making rapid progress since the last exhibition is the only system of its kind in the world. During the past few years this system of oil-free lubrication has been the basis of a number of steam recovery schemes on steam engines, steam hammers, and steam pumps. 'Collgraf' eliminates oil entirely for steam cylinder lubrication purposes, i.e, exhaust steam and condensate are entirely oil free and can be used for direct process work or boiler feeding. 'Collgraf' as the means of further utilisation of steam is operating in steel works, breweries, hospitals, soap works, and on board ships. Three oil refineries in this country and a number abroad have now abandoned oil lubrication on their steam reciprocators in favour of 'Collgraf.'

Also exhibited are the Company's well-known 'Stauffer' lubricators and greases.

Switchgear for Boilers

Ronald Trist & Co., Ltd.

Bath Road, Slough.

STAND 4, ROW N, GROUND FLOOR, N.H.

Ronald Trist & Co., Ltd., again exhibit their 'Thermofeed' regulator, 'Hilo' alarm and 'Mobrey' control equipment, and these exhibits are arranged in such a manner as to demonstrate their application to boiler plant. In the field of automatic feed water regulation and also low water alarm systems, the Company is very well-known, and now in the wider field of liquid level control their 'Mobrey' magnetic level switches are rapidly establishing a similar position.

The robust construction and simplicity of design of these switches have made them particularly suitable for marine application, and many of the leading shipping companies have now standardised these switches. The basic range of level switches will be on display, but there are now more than one hundred variations of these basic models, many of which have been developed to meet the specialised needs of industry. All the switches are completely glandless and it is this unique feature which has made them so successful in the chemical industry where it is often necessary to work with corrosive liquids or with liquids calling for flameproof equipment.

At this year's exhibition part of the stand is given over to the display of magnetic level switches actually controlling the level of a liquid in a specially constructed tank.

Divided Grate Furnace

Turbine Furnace Co., Ltd.

238b, Gray's Inn Road, London, W.C.1.

STAND 7, ROW A, GROUND FLOOR, G.H.

The 'Turbine' patent furnace, with its well-known sub-divided grate, ensuring even air distribution, is shown

as fitted to a Lancashire boiler. The left-hand flue has a grate arranged for mechanical firing by means of a shovel type stoker, the right-hand flue being shown fitted for normal hand firing.

Both furnaces are supplied with the necessary air for combustion of the required quantity of fuel by a forced draught fan, driven by vee ropes from an electric motor. There is provision in the hand-fired grate of forced secondary air over the fires to create turbulence and complete combustion, minimising black smoke.

The mechanically fired grate is low in upkeep cost, as there are no moving parts in contact with the fire, and the shovel stoker will deliver fuel up to 2 in. cube evenly over the whole of the grate.

Details of installations made in all parts of the world to all types and sizes of boilers, using a variety of fuels, from wood waste, etc., to the best coal, are available, and the company invites enquiries on combustion problems generally, as, in addition to fitting controlled combustion equipment to shell type and water tube boilers, special grates are supplied in large numbers for use with vertical boilers, resulting in fuel economy and increased boiler efficiency.

Industrial Lubricants

Wakefield-Dick Industrial Lubricants Division

46, Grosvenor Street, London, W.1.

STAND 10, INNER ROW, G.H. GALLERY.

In addition to a wide variety of Wakefield-Dick industrial lubricants, C. C. Wakefield and Co., Ltd., exhibit their lubricator demonstration unit. This mobile unit is designed to give action displays of mechanical lubricators—oil and grease—to works' engineering staffs in addition to exhibiting a wide range of kindred lubrication equipment. The unit has already been well received on a brief proving tour of the country, and at this exhibition engineering executives are invited not only to inspect the unit, but make an appointment there and then, if they wish, for a demonstration in their works.

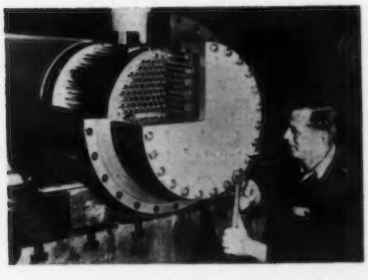
Gas Cleaning Plant

Whessoe, Ltd.

25, Victoria Street, London, S.W.1.

STAND 14, ROW J, G.H.

Of special interest to fuel engineers is the section of the Whessoe stand devoted to the specialised field of gas cleaning. The entire process is reviewed as unit operations—condensers, detarrers, scrubbers and purifiers—and as integrated sequences performing the complete process. Plant for coke oven and gasworks are illustrated, as well as producer gas and blast furnace gas cleaning plant. Particular features include a model of a complete purification plant and another illustrating the W.W-D. plate-type detarrer. Also illustrated are high and low-pressure gasholders.



A sectioned high duty, liquid to liquid floating head type heat exchanger, on the Whessoe, Ltd., stand.

Gas engineers will be interested in the pressure storage spheres which Whessoe offer for the storage of butane and similar gases. A range of special tank fittings is also on show.

Other sections of the stand illustrate the Company's special abilities in steel-plate construction and in the fabrication and erection of welded steel storage tanks, and the various methods of vapour conservation recommended by Whessoe. Also prominently displayed is a high duty liquid to liquid heat exchanger sectioned to show individual constructional details.

Pumps and Valves

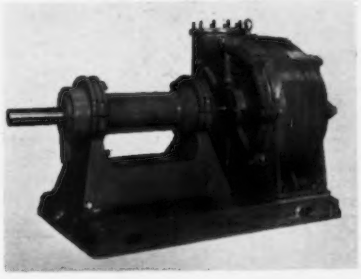
Wilkinson Rubber Linatex, Ltd.

Frimley Road, Camberley, Surrey.

STAND 10, OUTER ROW, GALLERY, N.H.

The well-known range of Linatex products for handling abrasive and corrosive materials are on display. These include the Linatex single-stage centrifugal pump, particularly suitable for handling abrasive suspensions, and the Linatex ball mill for fine grinding of chemicals, dye stuffs, pottery glazes and vitreous enamels. Examples of plant linings including chemical tanks and pipes are also on view.

The latest developments of the Company, including a Linatex lined diaphragm pump and a 'fullway' valve will be of interest to plant engineers faced with handling a wide variety of difficult materials. A special display is also arranged to show the fabrication of Linatex components, the process being quite unique and enabling prototypes and special purpose components to be made without moulds or dies.



Wilkinson Rubber Linatex, Ltd., are displaying this 12 in. Linatex Centrifugal Pump.

Reducing Valves and Compressors

Williams & James (Engineers), Ltd.

Chequers Bridge, Gloucester.

STAND 1, ROW B, GROUND FLOOR, G.H.

The stand includes a display unit showing the operation of air pressure regulators, another introducing the 'Pneumerstat'—an instrument combining the duties of a pressure reducing valve, flow control valve, and bubbler chamber, and a third unit showing the operation of starter motors. A selection from the range of automatic air compressor plants designed for the instrument industry is also shown, including the 'oil-free' compressor introduced at the previous exhibition.

A selection from the new range of compressors, for capacities up to 130 cu.ft. per minute, is included.

Wright Bindley & Gell, Ltd.

Percy Road, Greet, Birmingham, 11.

STAND 2, ROW CC, E.H.

On this stand is shown, for the first time in this country, a comprehensive range of 'Rego' LP-gas equipment which is now made available by LP-Gas Equipment, Ltd., of Birmingham, under a licence from the Bastian Blessing Company, of Chicago, U.S.A. LP-Gas Equipment, Ltd., have drawn extensively upon the technical progress and wide experience of their American associates in the provision in this country of a complete range of equipment suitable for domestic and industrial purposes, and are now preparing to meet the requirements for storage, transportation and bottling of L.P. gases.

The exhibit includes a comprehensive selection of low-pressure regulators and cylinder valves which are in use on all types of installations. Practical demonstrations are shown of automatic throw-over manifolds which are appropriate to multi-cylinder systems

These interests of the Wright Bindley & Gell Group are being demonstrated by sample panels showing a wide range of pressings and stampings in all metals, meeting the requirements of practically all industries. The items exhibited indicate the extent to which customers' own specifications can be met by the design and production services provided by the Group. Although the organisation is able to offer products in substantial quantities under mass production conditions, the outstanding feature of W.B.G. metal productions is on quality and accuracy in meeting customers' requirements. The organisation produces for its own requirements and for sale to customers a substantial range of rolled strip in brass and copper alloys, and in commercial aluminium, examples of which are shown in the exhibit.

The products of Messenger & Sons (Birmingham), Ltd., are represented by a range of fittings and equipment for the gas, heating, lighting and cooking industries, for which many types of gas cocks, taps, injectors, thermostats and other fittings are provided.

Pumps and Filters

Zwicky, Ltd.

Slough, Bucks.

STAND 4, ROW V, E.H.

Zwicky, Ltd., manufacturers of pumps and filters, are exhibiting this year a number of hand-operated pumps for a variety of services, including oil burner starting-up, auxiliary fire, oil transfer and the supply of galley fresh water.

The filtration side of Zwickys is represented by a number of dual and single filters of their standard wire gauze type and also by one of their new Zwicky-Clinsol plate type filters with electrical automatic self-cleaning equipment shown in operation. The double helical gear rotor pump with bearings sealed off from the pumped fluid and running in their own baths of lubricating oil is also on display, illustrating one of a range manufactured by this firm.

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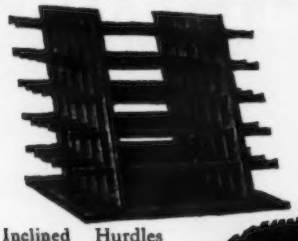
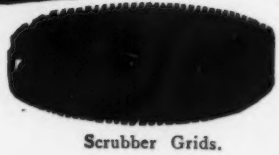
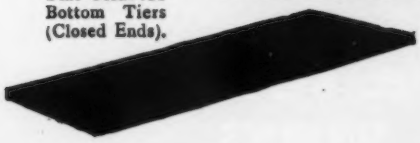

Inclined Hurdles (Light or Heavy Type) with Bottom Flat Grids.


Scrubber Grids.

Open Space Grids or Upper Tiers.

Patent Double-Barred Grids.

Flat Grids for Bottom Tiers (Closed Ends).



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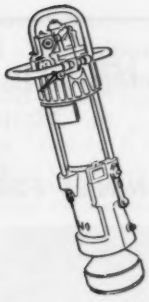
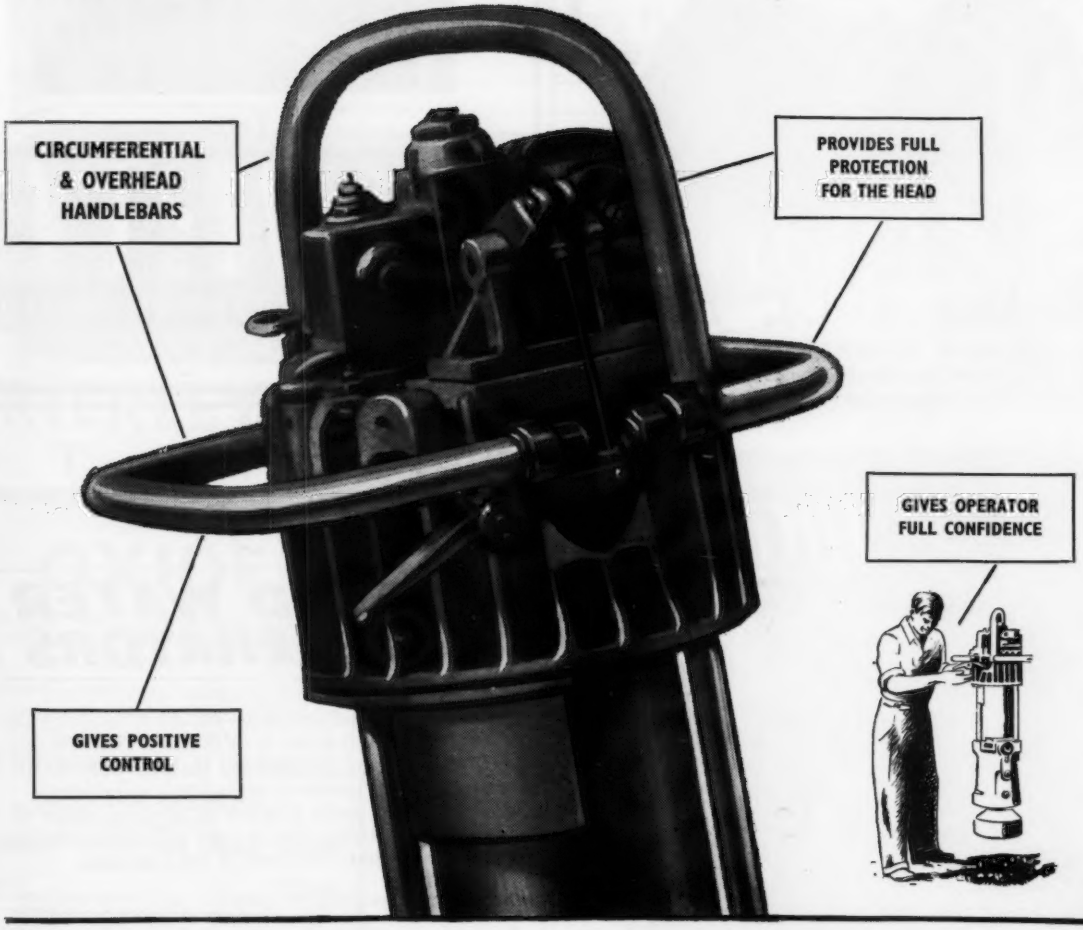
REPRESENTATIVE: Mr. W. E. Settle, 66, Bridgewater Road, Bradford, Yorks.

Warsop  'Benjo' Rammer

NOW A JUMP AHEAD!


CIRCUMFERENTIAL & OVERHEAD HANDLEBARS
PROVIDES FULL PROTECTION FOR THE HEAD
GIVES OPERATOR FULL CONFIDENCE
GIVES POSITIVE CONTROL

TAKE THIS TRIED AND PROVED 'BENJO' RAMMER with its constant jumping height (through its positive automatic lubrication system) and 100% reinstatement ability. Add to it this new circumferential handlebar which protects the head mechanism and makes operation easy. Then you've got the finest rammer that money can buy. Get in touch with your local sales and service depot and ask for free demonstration.

ALSO MANUFACTURERS OF THE NEW WARSOP S7 BREAKER, WARSOP DP ROCK DRILL AND NEW RANGE OF WARSOP CENTRIFUGAL PUMPS

WARSOP
PORTABLE POWER TOOLS

WARSOP POWER TOOLS LTD., 27 LOWER REGENT STREET

LONDON, S.W.1. REGENT 4632 (4 lines) Telegrams : Warpetdril, Piccy, London.

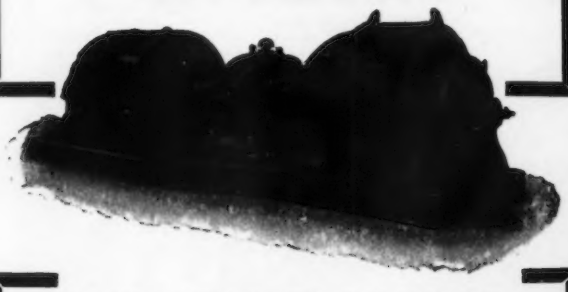
Sales and Service Depots :—

Basingstoke. *Hopgoods Yard, Southend Road*
Belfast. *154a Stranmillis Road*
Bottisham, Cambs. *Tunbridge Lane*
Burton-on-Trent, Staffs. *58a King Street*
Dublin, Eire. *25 Smithfields*
Leeds. *Gelderd Road, Gildersome*
Motherwell, Scotland. *Bruce Road, Carfin Industrial Estate*
Newcastle. *28 Greywood Road, Fenham*
Newport. *Morris Prosser Works, Adelaide St.*
South Croydon, Surrey. *Carlton Road*
Stockport. *69a Claremont Road, Great Moor*
Taunton. *"The Shelter", Pig Market Lane, High Street*

TURBO-COMPRESSORS & EXHAUSTERS FOR AIR AND GAS.

★ ★ ★

We build a complete range of Compressors & Exhausters for air and GAS, suitable for all purposes connected with the GAS industry, including Turbo-Compressors for large capacities, as illustrated below.



WRITE FOR PAMPHLET No. 1018 GIVING PARTICULARS—

REAVELL & CO., LTD.,
RANELAGH WORKS, IPSWICH.
Telegrams: REAVELL, IPSWICH Telephone: 2124 & 5.

Specialists in the repair of defective Reinforced Concrete Structures, etc.

also

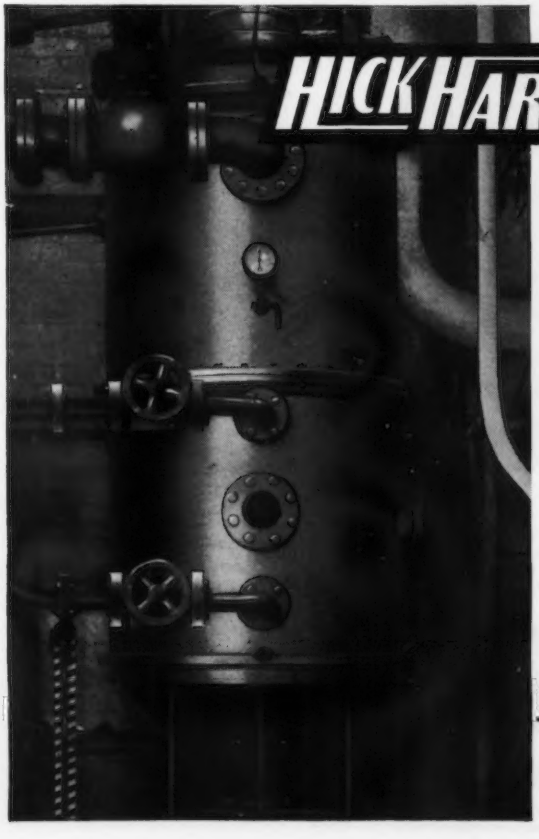
LININGS FOR STEEL BUNKERS.

THE

GUNITE

CONSTRUCTION CO. LTD

WESTERN HOUSE, HITCHIN, HERTS.



HICK HARGREAVES FEED WATER DEAERATORS

The most efficient—and simplest—means of reducing the oxygen content of feed water is to install a Hick Hargreaves patented Recirculating De-aerator. Having no floats or spray valves this de-aerator is exceedingly reliable in use and is able to provide effective de-aeration under all conditions of flow, being able to cope efficiently with the widest and most rapid variations in the feed rate.

Available in two types—

1. Straight spray for feed temperature above 130°F. (55°C.)
2. Direct contact heater De-aerator with patent atomising jet system, for feed temperatures below 130°F. (55°C.)

The illustration shows a Hick Hargreaves De-aerator size 40D at the Margam Works of the Steel Company of Wales Ltd. Consulting Engineers : Messrs. McLellan & Partners

H1274

HICK HARGREAVES & CO. LTD
SOHO IRONWORKS BOLTON

PUBLISHERS' NOTICE

The " Gas Journal " is published every Wednesday, price 1/3d.; by post 1/5d.

Subscription Rates: Home and Empire:—52/- per annum; Foreign:—60/- per annum. (Both payable in advance.) A copy of the " Gas Journal " Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 1/9 per line (approx. 7 words)—minimum charge 10/6. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10" deep × 7" wide; block screen 120.

BUSINESS MANAGER: S. T. CULLEN

MIDLANDS OFFICE: 10, Union Street, Birmingham.

NORTHERN MANAGER: W. Q. Foster, 33, St. Helens Road, Harrogate. *'Phone:* Harrogate 84291.

WALTER KING, LTD., 11, Bolt Court, Fleet Street, London, E.C.4.

Telephone: CENtral 2236-7. *Telegrams:* Gasking, Fleet, London.

WESTWOOD & WRIGHTS LIMITED

BRIERLEY HILL, STAFFS.

GASHOLDERS · PURIFIERS · WASHERS
CONDENSERS · CASTINGS · STEELWORK
GAS VALVES · WELDED PIPES

OXIDE

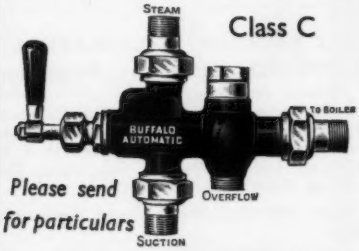
DUTCH AND DANISH BOG ORE
SPECIALLY ACTIVATED OXIDE OF IRON

Oxide supplied on loan or sale outright.
Highest prices paid for Spent Oxide.

Send your enquiries to

GAS PURIFICATION & CHEMICAL COMPANY LIMITED
ESTABLISHED 1873
PALMERSTON HOUSE, OLD BROAD STREET, LONDON, E.C.2.
Telegrams: "Purification, Stock, London." Telephone: London Wall 5077

BUFFALO INJECTORS



Class C

Please send for particulars

GREEN & BOULDING, Ltd.
162a Dalston Lane, London, E.8

FIRE!

GENII GALORE IN EVERY

NU-SWIFT!

Sealed pressure charges explain the speed, reliability and efficiency of Nu-Swift Fire Extinguishers. Strike the knob—the genii instantly leap out to slay your fire!

NU-SWIFT LTD · ELLAND · YORKS
In Every Ship of the Royal Navy

"KLEENOFF" *
THE COOKER CLEANER

"KLEENOFF"
FIBRE BRUSHES
RUBBER MOPS

"KAY-DEE" *
KETTLE DESCALER

For resale to the public, and in bulk for Works use.

BALE & CHURCH, LTD.
7, CROMPTON WAY, CRAWLEY, SUSSEX.

APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

SALES REPRESENTATIVE required for North Midlands and North by old established company of appliance manufacturers. The position can be permanent, progressive and pensionable. Remuneration will be by salary and commission and full expenses will be met. Applicants, who must be car owners, are invited to submit fullest details which will be treated in strict confidence. Apply: No. 162, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

WEST MIDLANDS GAS BOARD
NORTH STAFFORDSHIRE DIVISION
DISTRIBUTION SUPERINTENDENT—
KIDSGROVE DISTRICT

CANDIDATES should have a sound knowledge and practical experience of main and service laying, the installation of gas appliances, the control and supervision of workmen, and the general administration of a gas distribution department.

The salary for the post will be within Grade VI (£490-£570 per annum) of the National Salary Scales for Gas Staffs.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, present position, and details of experience, together with the names of two referees, should be addressed to Mr. J. E. Stanier, Divisional General Manager, West Midlands Gas Board, Etruria Gas Works, Stoke-on-Trent, to reach him within fifteen days of the appearance of this advertisement.

F. H. CURETON,
Secretary to the Board.

(*Classified advertisements continued on page* 606)

APPOINTMENTS VACANT (ctd.)

EXECUTIVE ENGINEER required with good experience in the construction of Coal Carbonising and Coke Oven Plant. Age about 40. The position and prospects are good. Apply: No. 161, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

OPERATORS required for Intermittent Chambers and Horizontals, knowledge of Gasworks tests an advantage. All applications in confidence to W. J. Jenkins & Co., Ltd., Beehive Works, Retford, Notts.

GAS EXAMINER
DOMINION LABORATORY, WELLINGTON, DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH, NEW ZEALAND

APPLICATIONS are invited from graduates or persons with other suitable qualifications for the position of gas-examiner under the New Zealand Gas Regulations. Duties involve regular visits to about 15 gasworks and considerable travelling. Salary £770-£920 (New Zealand) according to qualifications and experience. Further details may be obtained from the High Commissioner for New Zealand, 415 Strand, London, W.C.2, with whom applications close on October 5, 1953.

NORTH EASTERN GAS BOARD
DEPUTY TO CHIEF ENGINEER

APPLICATIONS are invited for the position of DEPUTY to the CHIEF ENGINEER at the Head Office of the Board at Leeds. Applicants must be qualified engineers, experienced in the layout and design of gasworks plant and equipment, and capable of controlling and supervising engineers and drawing office staff. Applicants should be preferably Corporate Members of the Institution of Civil, Mechanical, Electrical or Gas Engineers.

Salary will be commensurate with experience and qualifications and will commence at not less than £1,450 per annum.

The successful applicant will be required to pass a medical examination and to participate in the Board's Superannuation Scheme.

Applicants should complete the official application form, which may be obtained on request, and forwarded to the Chief Engineer, North Eastern Gas Board, Bridge Street, Leeds, 2, to be received by him not later than Monday, September 21, 1953.

J. C. GARDNER,
Secretary.

SCOTTISH GAS BOARD
NORTHERN DIVISION
INVERURIE DISTRICT

APPLICATIONS are invited from suitably experienced and qualified persons for the position of DISTRICT MANAGER at Inverurie with responsibility for the neighbouring Undertaking of Oldmeldrum.

The post is superannuable and the salary offered is in accordance with the Board's scale of salaries Provincial 'B', A.P.T. VI (£475-£555) with free house, coal and gas.

Applications giving age and full details of qualifications, training and experience should be lodged with the undersigned not later than Tuesday, September 15, 1953.

H S. MILNE,
Divisional Controller.

50, Cotton Street,
Aberdeen.
August 19, 1953.

NORTHERN GAS BOARD
DEPUTY DIVISIONAL GENERAL MANAGER
TEES-SIDE DIVISION

THE present Middlesbrough and Stockton Divisions of the Board will shortly be combined to form the Tees-side Division. Applications are invited for the position of DEPUTY GENERAL MANAGER of the combined Division, at a salary of £1,650 per annum. Candidates must be persons of wide experience in the Gas Industry; they should address their applications to reach the undersigned not later than September 25, stating age, qualifications, experience and the names of two referees.

A satisfactory report by the Board's medical officer, and participation in the Board's Superannuation Scheme, will be conditions of engagement.

J. F. JACKSON,
Secretary to the Board.

EAST MIDLANDS GAS BOARD
LEICESTER AND NORTHANTS DIVISION
DRAUGHTSMAN

APPLICATIONS are invited for the position of DRAUGHTSMAN in the Divisional Headquarters at Leicester. Grading and salary within the range A.P.T. VI-VIII (£490-£665) commensurate with qualifications and experience.

Preference will be given to candidates possessing a recognised engineering qualification and having specialised experience in either installation drawings for gas works, chemical works or similar plant; pipe work installation drawings; reinforced concrete design; or standard steelwork design.

The successful candidate may be required to pass a medical examination, and unless already subject to a pension scheme by virtue of the Gas (Pension Rights) Regulations 1950, will be required, if eligible, to join the Board's Staff Pension Scheme within six months from taking up the appointment.

Applications stating age, qualifications, present position and experience, and giving the names of two referees, should reach the undersigned not later than Monday, September 28, 1953.

H. B. TAYLOR,
Divisional General Manager.

Millstone Lane,
Leicester.
September 1, 1953.

FOR SALE

FOR SALE—One—24 in. WECK VALVE, 4 way C.I. Construction, packed discs. Condition equal to new. May be inspected at: Newton, Chambers & Co., Ltd., Heavy Construction Division, Thorncliffe, near Sheffield.

PUBLICATIONS

GAS ACCOUNT CALCULATORS

SUPPLIED either by Price per Therm or Thousand, for any specified Calorific Value, in book form, office charts, or pocket charts for Meter Inspectors, printed in clear type. Write for particulars to F. H. WAKELIN, LTD., Calculator Specialists, 354, WHEELER STREET, BIRMINGHAM.

'Phone: Northern 0989. 'Grams: Reckoners, B'ham.

EDUCATIONAL

TRAINING IN FUEL TECHNOLOGY. Home Study Courses for the City and Guilds of London Institute Examinations in Scientific Principles of Fuel Technology (Intermediate) and in Solid and Gaseous Fuels (Advanced Grade) under the new Education Scheme of the Institute of Fuel have been arranged by the College of Fuel Technology, 90 Talbot Road, Highgate, London, N.6. Courses for the new Boiler Operators Certificate and in Boiler House Practice (both Grades) and Gas Technology are also available.

Principal: ARTHUR COE, F.INST.F.
Prospectus on application.

MISCELLANEOUS

SMALL single truckloads and larger quantities of good ROUGH BREEZE from any gasworks, large or small, in the United Kingdom required by merchants paying own railway tolls. Cash price and particulars to No. 9378, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

FACTS ON THE PLATE

THESE DAYS, a sound investment is something to write home about. What we write of here is not a new discovery, for it has long been at the disposal of industry. The point is that only the alert are using it to their full advantage. We refer to the help afforded to administration by a FULL PHOTOGRAPHIC RECORD of constructional jobs from foundation to completed building, from rough casting to finished product. Nothing escapes the eye of the camera. No other recorder covers such a wide field. A progressive file of photographs taken at regular, specified intervals, is an ever-present aid to the busy executive. It can be referred to at once in case of any point which may arise during the construction of plant or the making of a product. It shows progress at a glance unmistakably and eliminates the cause of wrangling and argument.

Walter King Photographs are specially staffed and equipped for this type of work and are prepared to tour the Midlands, Southern Counties, and Home Counties

Details of this photographic service on request to Walter King, Ltd., 11, Bolt Court, Fleet Street, London, E.C.4.

PRESSURE VESSELS
FOR THE GAS AND CHEMICAL INDUSTRIES
Welding in all Metals (Gas or Electric)
Welding Repairs
RICHMOND WELDING CO.
Richmond Road, BRADFORD
Tel.: BRADFORD 25405

SCRAP GAS METERS WANTED

Top prices paid—Collection arranged from anywhere in U.K.

Sell to those best suited to deal with them.

Sell to — MITCHAM SMELTERS LIMITED
Rometal Works, Red House Road,
Mitcham Road . . . CROYDON . . . Surrey.
Tel: THOrnton Heath 6101. (Private Branch Exchange).

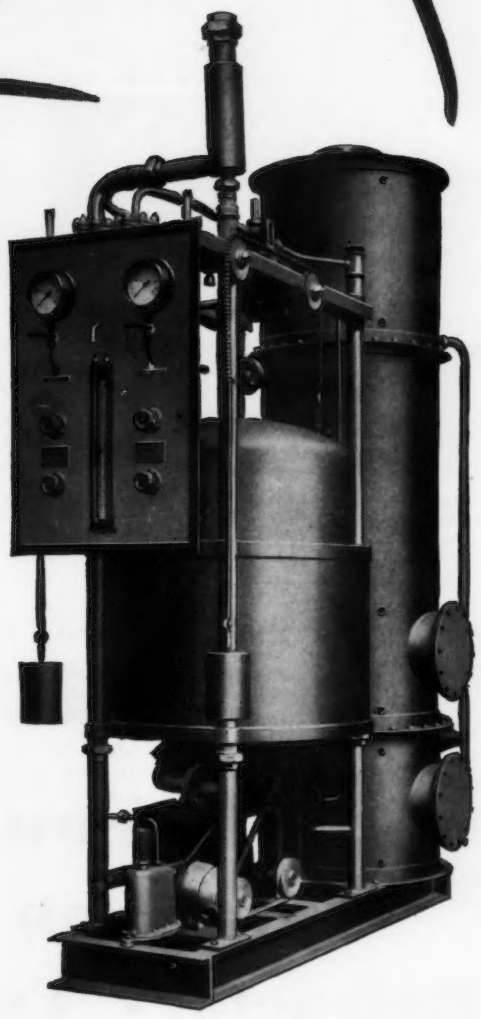
Truck Loads to our own private siding, Beddington Lane, Southern Region.

Your

MODERN GAS SUPPLY

at the touch of a button!

The Holmes-Mallet Plant illustrated delivers 6-8000 cu. ft. per hour of a mixture of butane and air which can be used for domestic or industrial purposes.



ADVANTAGES

- The plant is simple and can be supervised by one operative.
- It is arranged for manual push button stop and start **or** controlled automatically from holder.
- The calorific value of the mixture can be altered to suit requirements, and will be constant at any one setting.
- The plant occupies little space.
- It is designed to comply with Government Safety Regulations.

The HOLMES-MALLET BUTANE/AIR PLANT

W. C. HOLMES & CO. LTD.

FOUNDED 1850 HOLMES HUDDERSFIELD

HUDDERSFIELD • LONDON • BIRMINGHAM

Tel: Huddersfield 5280 London: Victoria 9971 Birmingham: Midland 6830

©1678

industrial gas compressors

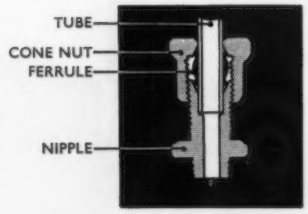
FOR COMPRESSING AIR OR GAS SUPPLIES USED FOR FURNACE HEATING, METAL MELTING, BRAZING, SOLDERING BITS, LAUNDRY IRONS, ETC.

DIRECT COUPLED COMPRESSORS (see *illustration right*) *are fitted with automatic internal by-pass valves and lubrication systems. They are direct coupled to Keith Blackman motors. Type OA compressors in this range occupy a floor space of only 18" x 7½".*
CAPACITY RANGE: *100 to 750 cub. ft. of gas or air per hour at 3 lbs. per sq. in. pressure.*

TYPE 4 COMPRESSORS (*not illustrated*) *are also fitted with automatic internal by-pass valves and lubricators. The complete unit includes motor and drive on a common bedplate, all of Keith Blackman manufacture.*
CAPACITY RANGE: *500 to 20,000 cub. ft. of gas or air per hour at 3-5 lbs. per sq. in. pressure.*
AREA OCCUPIED: *from 9¼" x 16½" to 61" x 27".*

DID YOU KNOW?

KEITH BLACKMAN have been making compression joints for many years and the present design embodies features developed as a result of this long experience. *Notice that the shape of the ferrule is such that the joint is made without unduly stressing the tube.*



serving to burn

Note: the four burner heads (right) are for high pressure gas, or low pressure gas and air blast.

LEFT: "Fishtail" type burner *with two-armed stamped pattern injector for heating liquid in tanks by submerged combustion tubes. For use with low pressure gas supplies.*
Size Range: *1", 1¼", 1½", 2" and 2½" outlets.*
Capacity Range: *45-280 cub. ft. of gas per hour.*

Brass non-blow-off head types: *deal with 5 to 10 cub. ft. of gas per hour.*

Stainless steel, "F" type head, burner: *deals with 8 cub. ft. of gas per hour.*

Perforated head type burner: *deals with 10 to 15 cub. ft. of gas per hour.*

Keith Blackman LIMITED
MILL MEAD ROAD, TOTTENHAM, LONDON, N.17
Phone: Tottenham 3322 (twelve lines) Grams: Keithblac, Norphone, London
BRANCH OFFICES: AT MANCHESTER, BIRMINGHAM, LEEDS, GLASGOW, NEWCASTLE-ON-TYNE, PENARTH (near CARDIFF), AND BELFAST

INDUSTRIAL GAS EQUIPMENT

524

THE SYMBOL OF SERVICE AND QUALITY

Vitreous Enamels
Vitreous Enamelling
Refractory Coatings on Metals

Telephone:
MITcham 1634 (5 lines).

Telegrams:
Escol, Toot, London.

STEWART & GRAY LTD.

Paisley Works, Swains Road,
Tooting Junction, S.W.17.

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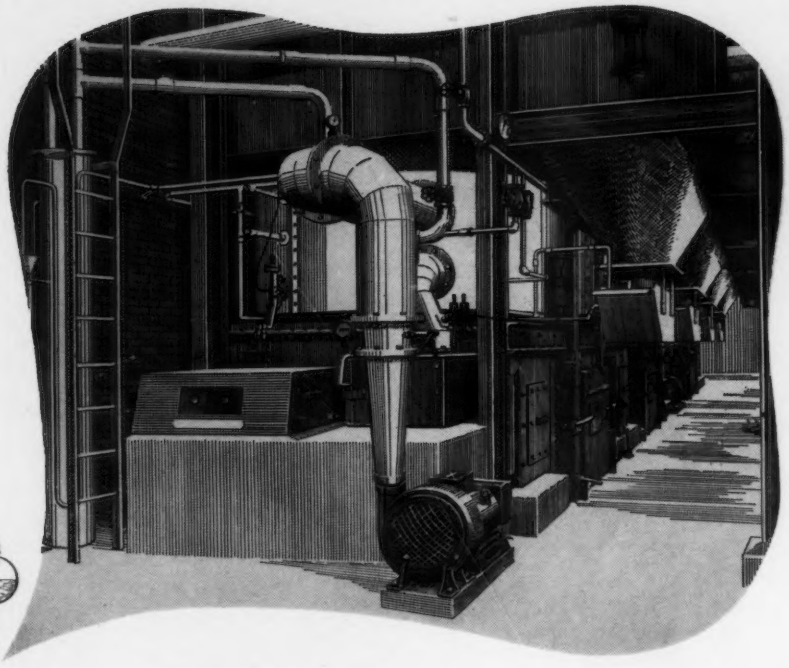
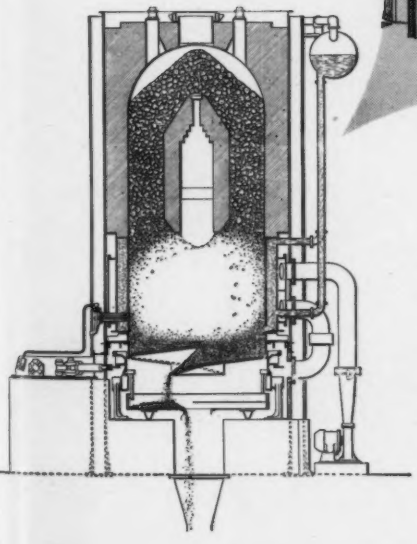
less labour, less fuel –
and the GAS STAYS HOT





West's "Hot Gas" Mechanical Producer

does more than eliminate manual clinkering. It has a hot gas efficiency of 90% and shows a marked reduction in the combustible content of the ashes. That, in turn, means fuel economy.

Producer and dust extractor are enclosed in a heavily insulated steel casing. The gas offtake, situated centrally immediately over the flare bed, draws off gas at formation temperature and is completely insulated, so that full advantage is taken of the sensible heat conveyed DIRECT to the settings. Dust extraction efficiency is up to 90%.

To maintain a constant depth of ash below the fuel bed, the speed of the revolving helical grate which removes the ash is automatically controlled by a novel device.

West's Gas
IMPROVEMENT CO. LTD.

ALBION IRONWORKS · MILES PLATTING · MANCHESTER 10

Telephone: COLlyhurst 2961. Telegrams: Stoker, Manchester.

London Office: Columbia House, Aldwych, W.C.2. Phone: HOLborn 4108-9 Grams: Wesgasco, Estrand.

Only gas

used in an

instantaneous water heater

gives an ample flow of

endless hot water that never runs cold

No other appliance and no other fuel gives this service.

When you sell an instantaneous water heater you sell the advantages of **gas!**

ASCOT

Only Ascot Instantaneous Gas Water Heaters are fi te
with Stainless Steel Burners — which have cut maintenance co st

ASCOT GAS WATER HEATERS LIMITED • 255 NORTH CIRCULAR ROAD • LONDON N.W.10 • WILLESDEN 5

A member of the PARNALL Group of Companies